ORIGINAL

E000018106

Elizabeth Lawrence
Manager, State Regulatory Strategy
and Compliance

Mail Station 9774
PO Box 53999
Phoenix, Arizona 85072-3999
Tel 602-250-3784
Elizabeth.Lawrence@aps.com

March 1, 2022

Docket Control
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

RE: Arizona Public Service Company (APS)
Demand Side Management (DSM) 2021 Annual Progress Report
Docket No. E-00000U-18-0055

Pursuant to the Electric Energy Efficiency Standards Rules (EESR) at A.A.C. R14-2-2409(A), "[b]y March 1 of each year, an affected utility shall submit . . . a DSM progress report providing information for each of the affected utility's Commission-approved DSM programs . . . ."

In addition, Decision Nos. 73089, 74006, 74703, and 74813 require the DSM progress reports to include supplemental information. Accordingly, APS submits its 2021 DSM Annual Progress Report in compliance with EESR and the above-referenced decisions.

Please let me know if you have any questions.

Sincerely,

/s/ Elizabeth Lawrence

Elizabeth Lawrence

EL/me
Attachments

cc: Elijah Abinah
Barbara Keene
Ranelle Paladino

ACC - Docket Control - Received 3/1/2022 2:57 PM
ACC - Docket Control - Docketed 3/1/2022 3:07 PM

ARIZONA PUBLIC SERVICE COMPANY

2021 DEMAND SIDE MANAGEMENT ANNUAL PROGRESS REPORT

March 1, 2022

I. Table of Contents

I. Introduction

Arizona Public Service Company (APS or Company) is filing this Demand Side Management Annual Progress Report (Progress Report) for 2021 (Reporting Period) in compliance with R14-2-2409(A) and the reporting requirements contained in Arizona Corporation Commission (ACC or Commission) Decision Nos. 73089, 74406, 74703, and 74813. This report includes the following information for all APS Demand Side Management (DSM) programs that were in place during the Reporting Period:

- APS's progress toward meeting the cumulative energy efficiency standard and the annual savings goal set forth in the 2021 DSM Implementation Plan;
- An identification of Commission-approved DSM Programs and measures by customer segment;
- A description of the findings from any research projects completed;
- A brief description of current programs;
- Program goals, objectives, and savings targets;
- Level of customer participation;
- Costs incurred disaggregated by type of cost, such as administrative costs, rebates and monitoring costs;
- A description of the results of evaluation and monitoring activities;
- kW and kWh savings;
- Environmental benefits including reduced emissions and water savings;
- Incremental benefits and net benefits in dollars;
- Performance incentive calculations;
- Problems encountered and proposed solutions;
- A description of modifications proposed for the following year;
- If applicable, program or program measure termination and proposed date of termination;
- Where applicable, reporting requirements included in Commission Decision Nos. 73089, 74406, 74703, and 74813. Due to the length of Decision No. 74703 reporting requirements, this information has been included in separate workpapers; and
- Other significant information.

II. 2021 DSM Program Results

A. Compliance with Energy Efficiency Standard (EES) Requirements

In the 2021 DSM Plan (Plan), APS forecasted estimated savings of 334,635 megawatt-hours (MWhs) for the year. In the Plan, APS proposed modifications based on informed estimates of current and expected market and economic impacts as a result of the COVID-19 pandemic. In order to best support customers impacted by this rare global health and economic crisis, APS leveraged DSM programs and services in the Plan to:

- Help limited-income customers, including those recently unemployed by the crisis.
- Help customers who face unexpected costs due to HVAC failures and other related equipment emergencies.
- Help non-profit organizations and agencies who provide community health and human services.
- Help for schools, historic facilities and other cultural sites that are important to the quality of life for Arizonans.
- Support APS's Trade Allies who provide energy services, as long as they can do the work in a safe manner.
- Support to help local small businesses continue operating through the economic impacts of this pandemic.

In 2011, the Arizona EES created an aggressive goal for 22% cumulative DSM energy savings by 2020. As a result of extensive collaboration with ACC Staff, stakeholders and Trade Allies, and strong participation by customers, APS has been able to achieve compliance with the 22% goal. As shown in Table 1 below, APS continued successful implementation of DSM programs in 2021 and continued to stay in compliance with the 22% cumulative savings goal throughout the year. In addition, in the 2021 DSM Plan, the ACC established a goal for APS to achieve annual incremental savings of 334,635 MWhs from approved DSM programs in 2021. As shown below, APS was able to deliver over 95% of this annual savings goal by achieving savings of 319,328 MWhs. Table 1 depicts DSM achievements for 2021.

Table 1 - 2021 DSM Savings Goal & Achievement

Goal Calculation	
2020 Retail Sales[1]	28,794,462
2021 DSM Savings Goal from Implementation Plan	334,635
Savings Results in MWh	
Contribution From Demand Response	575
Contribution From EE Programs & EE Initiatives	318,753
Total 2021 MWh Achieved	**319,328**
% of 2021 DSM MWh Achieved to DSM 2021 Implementation Plan Goal	95.4%
Cumulative MWh Savings Through 2021	
Cumulative Savings 2005 through 2021	7,142,849
EES Goal of 22% by 2020[2]	6,334,782
Savings Results Over (Under) 22% by 2020 EES Goal	808,067
Cumulative Savings % 2005 through 2021	24.8%
MER Verified Savings Results in MWh	
3rd Party 2021 MER Verified Savings	**319,328**
Difference: 2021 MER Verified to 2021 APR	-

[1]Includes billed and unbilled sales, does not include line losses, excludes Freeport McMoran Mine.

[2]Cumulative savings through 2020 are MER Verified MWh savings.

III. Program Results and Program Incentive Calculations

Program expenses are provided in Tables 2a through 3b. DSM program megawatt (MW) and megawatt-hour (MWh) savings are provided in Tables 4 and 5. Tables 6 and 7 provide net benefits and Table 8 shows the Performance Incentive calculation. Table 9 provides the environmental benefits associated with the lifetime energy savings resulting from DSM programs. Table 10 shows demand response (DR) load reduction and savings values.

A. Year-To-Date DSM Program Expenses

Table 2a - Demand Response Program Expenses 2021

Program	Rebates & Incentives	Measurement Evaluation and Research ("MER")	Metering	Program Implementation[1]	Program Marketing	Planning & Administration	Total Program Costs
Marketing & MER of Rate Options	$0	$0	$0	$0	$0	$0	$0
Peak Solutions	$0	$0	$0	$879,947	$0	$128,046	$1,007,993
Total	**$0**	**$0**	**$0**	**$879,947**	**$0**	**$128,046**	**$1,007,993**

[1]Includes the cost for the Implementation Contractor.

Table 2b - Energy Efficiency Program Expenses 2021

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implementation[1]	Program Marketing	Planning & Administration	Total Program Costs
Residential Programs							
Existing Homes	$2,797,326	$0	$0	$735,513	$229,392	$240,566	$4,002,797
New Construction	$1,892,806	$17,456	$81	$762,910	$21,870	$203,539	$2,898,662
Conservation Behavior	$0	$0	$1,040	$762,049	$0	$26,905	$789,994
Multi-Family	$374,147	$136,882	$165,654	$143,819	$20,646	$55,667	$896,815
Limited-Income	$7,479,103	$9,324	$352,202	$1,396	$2,086	$135,104	$7,979,215
Energy Storage Pilot	$0	$0	$0	$135,000	$0	$33,472	$168,472
Total	**$12,543,382**	**$163,662**	**$518,977**	**$2,540,687**	**$273,994**	**$695,253**	**$16,735,955**
Non-Residential Programs							
Existing Facilities	$3,927,800	$725,809	$193,845	$2,624,885	$179,526	$293,056	$7,944,921
New Construction	$4,991,852	$22,614	$11,529	$1,727,490	$7,252	$84,904	$6,845,641
Energy Information Services	$59,136	$0	$0	$113,324	$0	$0	$172,460
Schools[2]	$1,262,832	$41,134	$1,892	$523,276	$7,200	$44,317	$1,880,651
Advanced Rooftop Controls Pilot	$132,814	$0	$0	$7,666	$0	$0	$140,480
Total	**$10,374,434**	**$789,557**	**$207,266**	**$4,996,641**	**$193,978**	**$422,277**	**$16,984,153**
Other DSM Initiatives							
Energy Storage & Load Mgmt-Rewards Program	$5,758,250	$0	$687	$3,600,745	$27,794	$184,459	$9,571,935
Managed EV Charging Pilot	$44,530	$0	$0	$28,061	$5,826	$33,472	$111,889
Energy and Demand Education	$4,661	$0	$2,519,765	$2,756,521	$22,937	$0	$5,303,884
Codes & Standards	$0	$34,913	$0	$55,788	$0	$0	$90,701
Tribal Communities	$206,467	$0	$117	$105,246	$53,478	$0	$365,308
Total	**$6,013,908**	**$34,913**	**$2,520,569**	**$6,546,361**	**$110,035**	**$217,931**	**$15,443,717**
Total EE Programs	**$28,931,724**	**$988,132**	**$3,246,812**	**$14,083,689**	**$578,007**	**$1,335,461**	**$49,163,825**
						Measurement, Evaluation & Research	$2,327,440
						Performance Incentive[3]	$0
						Total EE Program Expenses	**$51,491,265**
						Total DSM Expenses	**$52,499,258**

[1]Includes the cost for the Implementation Contractor.

[2]Schools are permitted to receive funding from other Non-Residential programs. Refer to the Schools Program section for additional information regarding total funds allocated to school districts.

[3]Details of the Performance Incentive calculation are provided in Table 8.

Table 2c - 2021 Implementation Costs - APS Compared to Contractor[1]

Program	APS Expense	Contractor Expense	Total Implementation Cost
Residential Programs			
Existing Homes	$20,007	$715,506	$735,513
New Construction	$318,462	$444,448	$762,910
Conservation Behavior	$167,469	$594,580	$762,049
Multi-Family	$0	$143,819	$143,819
Limited-Income	$0	$1,396	$1,396
Energy Storage Pilot	$0	$135,000	$135,000
Residential Total	**$505,938**	**$2,034,749**	**$2,540,687**
Non-Residential Programs			
Existing Facilities	$121,126	$2,503,759	$2,624,885
New Construction	$14,952	$1,712,538	$1,727,490
Energy Information Services	$0	$113,324	$113,324
Schools	$0	$523,276	$523,276
Advanced Rooftop Controls Pilot	$0	$7,666	$7,666
Non-Residential Total	**$136,078**	**$4,860,563**	**$4,996,641**
Other DSM Initiatives			
Codes & Standards	$0	$55,788	$55,788
Energy Storage & Load Mgmt-Rewards Program	$78,980	$3,521,765	$3,600,745
Managed EV Charging	$2,730	$25,331	$28,061
Energy and Demand Education	$333,789	$2,422,732	$2,756,521
Demand Response	$0	$879,947	$879,947
Tribal Communities	$0	$105,246	$105,246
Other DSM Initiatives Total	**$415,499**	**$7,010,809**	**$7,426,308**
Implementation Costs	**$1,057,515**	**$13,906,121**	**$14,963,636**

[1] Required by Commission Decision Nos. 72060 and 73089.

B. Program-To-Date DSM Program Expenses

Table 3a - Program-To-Date Demand Response Program Expenses: January 2010 - December 2021

Program	Rebates & Incentives	Measurement Evaluation and Research ("MER")	Metering	Program Implementation[1]	Program Marketing	Planning & Administration	Total Program Costs
HEI Pilot	$596,904	$242,929	$0	$706,433	$129,123	$569,131	$2,244,520
Marketing & MER of Rate Options	$0	$0	$37,756	$147,290	$180,294	$0	$365,340
Peak Solutions	$0	$0	$51,017	$22,697,200	$0	$1,255,124	$24,003,341
Total	**$596,904**	**$242,929**	**$88,773**	**$23,550,923**	**$309,417**	**$1,824,255**	**$26,613,201**

[1] Includes the cost for the Implementation Contractor.

Table 3b - Program-To-Date: Energy Efficiency Program Expenses: January 2005 - December 2021

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implementation[1]	Program Marketing	Planning & Administration	Total Program Costs
Residential Programs							
Existing Homes	$113,683,440	$1,580,123	$2,018,217	$51,771,996	$8,906,362	$8,470,110	$186,430,248
New Construction	$38,368,221	$836,224	$130,678	$6,810,466	$3,280,697	$2,951,740	$52,378,026
Appliance Recycling	$1,445,036	$0	$0	$3,683,392	$1,147,461	$387,826	$6,663,715
Conservation Behavior	$0	$0	$1,040	$11,406,661	$0	$834,897	$12,242,598
Multi-Family	$5,954,621	$541,522	$570,965	$6,602,478	$138,230	$1,118,731	$14,926,547
Shade Tree	$165,813	$0	$3,837	$725,169	$19,407	$57,191	$971,417
Prepaid Energy Conservation	$0	$0	$0	$32,114	$1,744	$93,027	$126,885
Limited-Income	$42,719,311	$168,023	$966,768	$1,068,907	$189,430	$1,856,522	$46,968,961
Energy Storage Pilot	$0	$0	$0	$135,000	$0	$33,472	$168,472
Total	**$202,336,442**	**$3,125,892**	**$3,691,505**	**$82,236,183**	**$13,683,331**	**$15,803,516**	**$320,876,869**
Non-Residential Programs							
Existing Facilities	$139,864,501	$4,061,385	$691,477	$43,873,000	$8,110,217	$6,380,469	$202,981,049
New Construction	$30,117,665	$384,562	$84,955	$10,349,935	$1,299,721	$1,228,478	$43,465,316
Building Operator Training	$0	$56,897	$0	$22,043	$15,783	$7,480	$102,203
Energy Information Services	$485,487	$36,065	$1,797	$924,526	$13,919	$31,127	$1,492,921
Schools[2]	$20,088,986	$426,153	$39,970	$10,217,457	$847,922	$859,762	$32,480,250
Advanced Rooftop Controls Pilot	$132,814	$0	$0	$7,666	$0	$0	$140,480
Total	**$190,689,453**	**$4,965,062**	**$818,199**	**$65,394,627**	**$10,287,562**	**$8,507,316**	**$280,662,219**
Other DSM Initiatives							
Energy Storage and Load Mgmt-Rewards Program	$10,942,081	$4,578	$1,175	$9,220,770	$458,279	$641,579	$21,268,462
Managed EV Charging Pilot	$44,530	$0	$0	$28,061	$5,826	$33,472	$111,889
Energy and Demand Education	$154,661	$23,832	$9,509,694	$2,940,068	$560,883	$934,904	$14,124,042
Codes & Standards	$0	$90,642	$0	$540,182	$0	$127,308	$758,132
Tribal Communities	$206,467	$0	$117	$105,246	$53,478	$0	$365,308
Total	**$11,347,739**	**$119,052**	**$9,510,986**	**$12,834,327**	**$1,078,466**	**$1,737,263**	**$36,627,833**
Total EE Program Costs	**$404,373,634**	**$8,210,006**	**$14,020,690**	**$160,465,137**	**$25,049,359**	**$26,048,095**	**$638,166,921**
						Measurement, Evaluation & Research	$30,401,104
						Performance Incentive[3]	$55,439,017
						Total EE Program Expense	**$724,007,042**
						Total DSM Expense	**$750,620,243**

[1] Includes the cost for the Implementation Contractor.

[2] Schools are permitted to receive funding from other Non-Residential programs. Refer to the Schools Program section for additional information regarding total funds allocated to school districts.

[3] Details of the Performance Incentive calculation are provided in Table 8. The program-to-date performance incentive amount is a summation of the performance incentive amount as calculated during each previous reporting period beginning with the January through June 2005 Progress Report.

C. Year-To-Date DSM Electric Savings

Table 4 - DSM Electric Savings 2021[1,3,4]

Program	Gross Peak MW Capacity Savings	Gross Annual MWh Savings	Gross Lifetime MWh Savings[2]	Net Peak MW Capacity Savings[4]	Net Annual MWh Savings[4]	Net Lifetime MWh Savings[2,4]
Residential Programs						
Existing Homes	23.2	20,483	296,673	23.2	20,483	296,673
New Construction	11.5	16,581	323,519	11.5	16,581	323,519
Conservation Behavior	42.6	45,149	45,149	42.6	45,149	45,149
Multi-Family	1.2	5,365	101,749	1.2	5,365	101,749
Limited-Income	1.8	3,581	64,452	1.8	3,581	64,452
Total Residential	**80.3**	**91,159**	**831,542**	**80.3**	**91,159**	**831,542**
Non-Residential Programs						
Existing Facilities	17.7	95,373	1,471,676	17.7	95,373	1,471,676
New Construction	16.5	67,266	1,008,455	16.5	67,266	1,008,455
Energy Information Services	3.9	3,729	18,644	3.9	3,729	18,644
Schools[2]	5.3	25,019	379,817	5.3	25,019	379,817
Advanced Rooftop Controls Pilot	0.3	882	10,073	0.3	882	10,073
Total Non-Residential	**43.7**	**192,269**	**2,888,665**	**43.7**	**192,269**	**2,888,665**
Other DSM Initiatives						
Energy Storage and Load Mgmt-Rewards Program	113.0	546	546	113.0	546	546
Energy and Demand Education	-	-	-	-	-	-
Codes & Standards	6.3	28,620	291,992	6.3	28,620	291,992
System Savings	0.0	6,020	6,020	0.0	6,020	6,020
DR Contribution	28.2	575	575	28.2	575	575
Tribal Communities	0.0	139	2,265	0.0	139	2,265
Total Initiatives	**147.5**	**35,900**	**301,398**	**147.5**	**35,900**	**301,398**
Total DSM Savings	**271.5**	**319,328**	**4,021,605**	**271.5**	**319,328**	**4,021,605**

[1]Savings for 2008 and after are MER adjusted, per Decision No. 69663, and savings prior to 2008 are not MER adjusted.

[2]Refers to savings over the expected lifetime of all program measures.

[3]Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

[4]Measure level savings are too voluminous to include in this report and are provided to Commission Staff as part of Annual Progress Report workpapers.

D. Program-To-Date DSM Electric Savings

Table 5 - Program-To-Date DSM Electric Savings: January 2005 - December 2021[1, 3]

Program	Gross Peak MW Capacity Savings	Gross Annual MWh Savings	Gross Lifetime MWh Savings[2]	Net Peak MW Capacity Savings[4]	Net Annual MWh Savings[4]	Net Lifetime MWh Savings[2, 4]
Residential Programs						
Existing Homes	455.7	1,864,002	15,112,857	426.8	1,706,774	14,115,065
New Construction	102.8	184,214	3,590,368	101.9	182,210	3,550,282
Appliance Recycling	4.0	66,195	397,166	9.2	60,756	364,532
Conservation Behavior	169.5	436,031	436,031	169.5	436,031	436,031
Multi-Family	10.4	73,787	974,999	10.4	73,787	974,999
Shade Tree	1.1	2,005	60,114	1.1	2,005	60,114
Prepaid Energy Conservation	0.6	3,172	3,172	0.6	3,172	3,172
Limited Income	7.7	27,797	500,960	7.7	27,797	500,960
Total Residential	**751.8**	**2,657,203**	**21,075,667**	**727.2**	**2,492,532**	**20,005,155**
Non-Residential Programs						
Existing Facilities	349.4	1,969,328	27,004,387	343.4	1,918,967	26,313,120
New Construction	75.2	455,150	6,787,192	72.6	419,789	6,283,412
Building Operator Training	0.2	1,001	12,447	0.1	701	8,713
Energy Information Services	31.6	22,958	142,523	31.6	22,958	142,523
Schools	43.2	204,410	2,968,391	42.1	199,122	2,888,262
Advanced Rooftop Controls Pilot	0.3	882	10,073	0.3	882	10,073
Total Non-Residential	**499.8**	**2,653,729**	**36,925,013**	**490.1**	**2,562,419**	**35,646,103**
Other DSM Initiatives						
Energy Storage and Load Mgmt-Rewards Program	194.6	359,292	447,062	194.6	359,292	447,062
Energy and Demand Education	-	-	-	-	-	-
Codes & Standards	67.6	277,680	2,698,581	67.6	277,680	2,698,581
System Savings	-	35,865	35,865	-	35,865	35,865
DR Contribution	267.6	1,158,911		267.6	1,158,911	
Tribal Communities	-	139	2,265	-	139	2,265
Total Initiatives	**529.8**	**1,831,887**	**3,183,773**	**529.8**	**1,831,887**	**3,183,773**
Total DSM Savings	**1,781.5**	**7,142,819**	**61,184,453**	**1,747.2**	**6,886,838**	**58,835,031**

[1]Savings for 2008 and after are MER adjusted, per Decision No. 69663, and savings prior to 2008 are not MER adjusted.

[2]Refers to savings over the expected lifetime of all program measures.

[3]Savings are adjusted for line losses (energy 7.2%, demand 11.7%) and a capacity reserve factor of 15%.

[4]Based on 2010 MER Net to Gross Ratio ("NTGR") analysis, APS is utilizing a NTGR of 1.0 for all DSM programs and measures.

E. Year-To-Date EE Societal Benefits

Table 6 - Energy Efficiency Societal Benefits 2021

Program	Program Cost	Societal Benefits	Societal Cost	Net Benefits	Benefit/Cost Ratio
Residential Programs					
Existing Homes	$ 4,002,797	$ 14,268,429	$ 7,936,579	$ 6,331,850	1.80
New Construction	$ 2,898,662	$ 12,756,460	$ 10,406,059	$ 2,350,401	1.23
Conservation Behavior	$ 789,994	$ 861,262	$ 789,994	$ 71,268	1.09
Multi-Family	$ 896,815	$ 1,965,958	$ 1,584,020	$ 381,938	1.24
Limited-Income[1]	$ 7,979,215	$ 2,005,704	$ 2,005,704	$ -	1.00
Energy Storage Pilot	$ 168,472	$ -	$ -	$ -	-
Total Residential	**$ 16,735,955**	**$ 31,857,813**	**$ 22,722,356**	**$ 9,135,457**	**1.40**
Non-Residential Programs					
Existing Facilities	$ 7,944,921	$ 29,366,338	$ 22,221,554	$ 7,144,784	1.32
New Construction	$ 6,845,641	$ 22,879,649	$ 10,569,600	$ 12,310,049	2.16
Energy Information Services	$ 172,460	$ 1,460,976	$ 301,873	$ 1,159,103	4.84
Schools	$ 1,880,651	$ 8,122,374	$ 5,650,862	$ 2,471,512	1.44
Advanced Rooftop Controls Pilot	$ 140,480	$ 303,307	$ 221,417	$ 81,890	1.37
Total Non-Residential	**$ 16,984,153**	**$ 62,132,644**	**$ 38,965,306**	**$ 23,167,338**	**1.59**
Other DSM Initiatives					
Energy Storage and Load Mgmt-Rewards Program	$ 9,571,935	NA	NA	NA	NA
Energy and Demand Education Pilot	$ 5,303,884	NA	NA	NA	NA
Codes & Standards	$ 90,701	$ 6,005,902	$ 200,000	$ 5,805,902	30.03
Tribal Communities	$ 365,308	$ 65,400	$ 163,298	$ (97,898)	0.40
Measurement, Evaluation & Research	$ 2,327,440	$ -	$ 2,327,440	$ (2,327,440)	-
Performance Incentive	$ -	$ -	$ -	$ -	
Total Initiatives	**$ 17,659,268**	**$ 6,071,302**	**$ 2,690,738**	**$ 3,380,564**	**2.26**
Total Energy Efficiency Societal Benefits	**$ 51,379,376**	**$ 100,061,759**	**$ 64,378,400**	**$ 35,683,359**	**1.55**

[1]APS analysis is consistent with Decision No. 68647. Program Costs include weatherization. Societal Costs do not include bill assistance because it does not contribute to electric savings.

F. Program-To-Date EE Societal Benefits

Table 7 - Program-To-Date Energy Efficiency Societal Benefits: January 2005 - December 2021

Program	Program Cost	Societal Benefits	Societal Cost	Net Benefits
Residential Programs				
Existing Homes	$ 185,521,516	$ 689,387,302	$ 305,645,917	$ 383,741,385
New Construction	$ 52,378,026	$ 182,680,876	$ 115,142,281	$ 67,538,595
Appliance Recycling	$ 6,741,931	$ 17,548,709	$ 5,222,843	$ 12,325,866
Conservation Behavior	$ 12,242,598	$ 11,284,847	$ 11,837,251	$ (552,404)
Multi-Family	$ 14,926,548	$ 32,157,418	$ 21,262,580	$ 10,894,838
Shade Tree	$ 970,668	$ 4,512,595	$ 2,357,226	$ 2,155,369
Prepaid Energy Conservation	$ 126,885	$ 96,059	$ 122,220	$ (26,161)
Limited-Income[1, 2]	$ 46,968,962	$ 29,049,300	$ 29,049,300	$ -
Energy Storage Pilot	$ 168,472	$ -	$ -	$ -
Total Residential	**$ 320,045,606**	**$ 966,717,106**	**$ 490,639,618**	**$ 476,077,488**
Non-Residential Programs				
Existing Facilities	$ 202,981,049	$ 1,064,792,063	$ 484,576,322	$ 580,215,741
New Construction	$ 43,465,316	$ 227,848,877	$ 91,035,003	$ 136,813,874
Building Operator Training	$ 102,203	$ 424,302	$ 183,392	$ 240,910
Energy Information Services	$ 1,492,919	$ 7,503,140	$ 2,381,967	$ 5,121,173
Schools[2]	$ 32,480,250	$ 118,392,685	$ 70,039,483	$ 48,353,202
Advanced Rooftop Controls Pilot	$ 140,480	$ 303,307	$ 221,417	$ 81,890
Total Non-Residential	**$ 280,662,217**	**$ 1,419,264,374**	**$ 648,437,584**	**$ 770,826,790**
Other DSM Initiatives				
Energy Storage and Load Mgmt-Rewards Program	$ 18,488,794	NA	NA	NA
Energy and Demand Education Pilot	$ 15,915,659	NA	NA	NA
Codes & Standards	$ 758,132	$ 82,028,466	$ 31,088,663	$ 50,939,803
Tribal Communities	$ 365,308	$ 65,400	$ 163,298	$ (97,898)
Measurement, Evaluation & Research	$ 28,584,411	$ -	$ 28,584,411	$ (28,584,411)
Performance Incentive	$ 55,429,631	$ -	$ 55,429,631	$ (55,429,631)
Total Initiatives	**$ 119,541,935**	**$ 82,093,866**	**$ 115,266,003**	**$ (33,172,137)**
Total Energy Efficiency Societal Benefits	**$ 720,249,758**	**$ 2,468,075,346**	**$ 1,254,343,205**	**$ 1,213,732,141**

[1]Program Costs include weatherization and bill assistance. Societal Costs do not include bill assistance because it does not contribute to electric savings.

[2]APS analysis is consistent with Decision No. 68647.

G. 2021 Performance Incentive Calculation

APS has provided a calculation of the Performance Incentive in Table 8 below. This is shown for compliance reporting purposes only. APS did not request a Performance Incentive in the 2021 DSM Implementation Plan.

Table 8 - 2021 Performance Incentive

Achievement Relative to Performance Incentive Level	
Total MWh Saved in 2021	319,007
Less System Savings	6,020
Total MWh Saved less System Savings	312,987
Total MWh Saved less System Savings as % of 2021 Goal	**95.2%**

Achievement Relative to DSM Goal	Performance Incentive as % of Net Benefits	Performance Incentive Capped at No More Than $0.0125 per kWh saved
>100%	0%	283,428,000 kWh x $0.0125
Net Benefits (Prior to PI, Codes & Standards, System Savings and Tribal Com)	$0	
Calculation of Performance Incentive[1]	$0	$3,542,850
Performance Incentive Amount for 2021 (Min. of % of Net Benefits or Capped amount at $0.0125 per kWh)	**$0**	

[1]The Performance Incentive methodology/calculation was approved in Decision No. 69663 and was modified in Decision No. 71448 and Decision No. 74406.

H. Net Environmental Benefits

Table 9 - 2021 Net Environmental Benefits[1,2]

Reporting Period	Water (Mil Gal)	SOx (Lbs)	NOx (Lbs)	CO_2 (Mil Lbs)	PM10 (Lbs)
Year-to-Date: Jan - Dec	1,287	18,097	302,023	3,575	134,724
Program-to-Date: Since Jan 2005	18,827	264,758	4,418,511	52,304	1,970,974

[1]The environmental reductions are based on the net energy savings of all program measures installed during the Reporting Period over their expected lifetimes.

[2]Some measures will result in customer water savings, which this calculation does not include. Only utility water savings are included in this calculation.

I. Demand Response Load Reduction and Energy Savings

Table 10 - Demand Response Program
Load Reduction and Energy Savings 2021

Program/Initiative	Load Reduction (MW)	Energy Savings (MWh)
APS Peak Solutions	28.2	575
Critical Peak Pricing[1]	0.2	5
Time-of-Use Rates & Super Peak[1]	193.0	845,340
Total	221.4	845,920

[1] 2021 Savings data were not available in time to update this report for TOU and Super Peak Rates. 2020 savings data were used as an estimate.

J. Supplemental Charts

Table 11 - DSM Funds Billed by Customer Class: January - December 2021

	DSM Funds Collected by Class ($000)*	
Residential	$	16,525
Commercial	$	14,399
Industrial	$	1,939
Irrigation	$	19
Streetlights	$	122
Other Public Authority	$	3
Total DSM Funds	$	33,007

* Does not include $20.0 million collected in base rates through the system benefits charge in 2021. The ACC increased the portion of DSM funding in base rate collections from $10 million to $20 million in Decision No. 76295, Exhibit A, Section VIII, Appendix D as a result of APS's Rate Case Settlement Agreement.

Table 12 - Retail Sales by Customer Class: January - December 2021

Retail Sales	Year End
Residential	14,223,711
Commercial	12,729,685
Industrial	2,156,175
Irrigation	9,655
Lighting & Other Public Authority	109,010
Total Retail Sales (MWhs)	29,228,236

Table 13 - EE Savings for the Following Rate Schedules: January - December 2021

Rate Schedule	MW Savings[1]	Annual MWh Savings[1]	Lifetime MWh Savings[1]
E-32 L	18.0	97,811	1,480,797
E-32 TOU	1.0	6,086	109,162
E-34	0.2	1,040	16,467
E-35	0.3	1,301	19,393
E-36 XL	0.0	0	0
GS on E-30	0.0	0	0
Lighting Services	0.0	410	5,428

[1]Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Note: This table contains a subset of all non-residential rates, therefore the tables do not match Table 4.

K. Terms and Definitions Used in Tables 1-13

Consumer Education: Funds allocated to support general consumer education about DSM improvements and programs.

Free-Riders: Program participants who would have installed the DSM measures anyway, even if the program were not in operation.

Gross Savings: Demand and energy savings related to the DSM programs prior to accounting for reductions for free-riders and additions for spillover.

Measurement, Evaluation & Research (MER): Activities that will identify current baseline EE levels and the market potential of DSM measures, perform process evaluations, verify that energy-efficient measures are installed, track savings, and identify additional DSM research.

Net Savings: Demand and energy savings related to the DSM programs after accounting for reductions for free-riders and additions for spillover.

Performance Incentive: Percentage share of DSM net economic benefits (benefits minus costs), capped at a percent of total DSM expenditures, depending on the percent of MWh savings goal achieved.

Planning and Administration: APS's costs to plan, develop and administer programs including management of program budgets, oversight of the RFP process and implementation contractor, program development, program coordination and general overhead expenses.

Program Implementation: Program delivery costs associated with implementing the program including implementation contract labor and overhead costs, as well as other direct program delivery costs.

Program Marketing: Expenses related to program marketing and increasing DSM consumer awareness (direct program marketing costs as opposed to general consumer education).

Rebates and Incentives: Money allocated for customer rebates and incentives, installation of low-income weatherization and low-income bill assistance.

Spillover: Refers to indirect energy impacts of the program and estimated savings from customers who implement energy-efficient savings strategies as a result of knowledge of APS's program but who do not receive an incentive through the program.

Training and Technical Assistance: Cost of DSM training and technical assistance.

IV. Residential EE Programs

A. Existing Homes Program

Description

The APS Existing Homes program combines LED lighting, energy efficient smart thermostats, high efficiency HVAC, and Home Performance with ENERGY STAR® offerings into one comprehensive program. The combined program offers a one-stop shop for APS customers and local Trade Allies to access all of the DSM program savings opportunities that are available for existing homes under one convenient umbrella. The combined Existing Homes program includes all of the following currently approved DSM measures that were previously included in three individual programs:

- **Consumer Products**
  - Community Outreach LEDs (including online marketplace kits)
  - Energy Efficient Smart Thermostats
- **Residential Heating, Ventilation and Air Conditioning**
  - HVAC Quality Installation
- **Home Performance with ENERGY STAR®**
  - Duct Test and Repair
  - Western Cooling Control
  - Attic Insulation
  - Connected Water Heater Controls
  - Online and Onsite Energy Audits

Program Goals, Objectives, and Savings Target

The goal of the Existing Homes program is to promote a whole house approach to DSM by offering education, technical assistance and financial incentives for improvements to the building envelope, upgrades to the HVAC system and installation of energy efficient devices and controls within the home.

Table 14 - Existing Homes Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
45.9	28,091	339,378

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

During this Reporting Period, the combination of energy saving devices and measures implemented for participating customers totaled 156,352 units. See Table 15 for a breakdown of specific levels of customer participation per Existing Homes program elements.

Evaluation/Monitoring Activities and Research Results

- Conducted a literature review to update smart thermostat savings to include savings from thermostat optimization efforts such as Nest Seasonal Savings and ecobee eco+.
- Conducted audit data analytics to improve program offerings and marketing efforts and increase program conversion rate of audited customers.
- Reviewed and updated Existing Homes program measure analysis spreadsheets and the analytic database for air sealing and attic insulation (R7 to R43), connected pool pumps, low flow showerheads, shade screens, LEDs, and western cooling control measures.
- Researched and calculated iDSM savings additions to smart thermostats, rate optimized smart thermostats, water heater timers, and connected pool pump measures.
- Created a uniform workpaper template for savings reporting and verification.
- Held monthly meetings with program managers to coordinate on evaluation activities and updates to measure-level savings and costs to accurately track and report program achievements.
- Developed research plan and initiated process evaluation to assess effectiveness of in-person and virtual energy assessments, and initiated impact evaluation research to assess behavioral energy savings associated with energy assessments.
- Assisted in program design efforts to inform research plan to assess customer experience and energy savings impacts of rate optimized thermostats.

Consumer Education and Outreach

APS utilized numerous marketing and advertising channels to reach out to customers and educate them about the Existing Homes program as well as other APS customer programs including Limited-Income assistance programs. APS's tactics for customer outreach and education include digital means using emails, social media, aps.com, azhomeperformance.com, and Energy Analyzer online. Due to COVID-19 safety protocols, APS paused customer education and outreach at in-person events such as the Maricopa County Home and Garden Shows as in years past. During the pandemic, APS ensured that DES offices were aware of the Company's assistance programs and had literature/applications for APS customers to use. APS continued to follow COVID-19 safety protocols throughout 2021 and focused on alternative methods to achieve outreach objectives while helping APS customers, primarily working on weatherization efforts and the Virtual Energy Checkup (VEC). During this reporting period, 276 APS customers were educated and had weatherization work completed via the smart thermostat phone hotline.

APS's online Marketplace reaches customers digitally and provides access to educational information, APS rebates and special discounts on energy efficient devices and appliances. *See* Section VIII. Energy Efficiency Initiatives – *Energy and Demand Education* for APS Marketplace description. The online Marketplace was used throughout the year to promote participation in the Existing Homes program. As part of Marketplace promotions, APS offered energy efficient LED light bulb kits to customers at no cost and saw significant participation. Throughout the year, APS offered no-cost Nest and ecobee thermostats through the Marketplace for customers who agreed to have their thermostat pre-enrolled to participate in the Cool Rewards demand response program. Customers were able to receive their EE thermostat rebate and Cool Rewards participation incentive along with manufacturer discounts at checkout resulting in a net zero cost (taxes and shipping were paid by the customer).

Problems Encountered and Proposed Solutions

The presence of COVID-19 during the program year affected implementation in several ways and required many modifications to program implementation practices that were designed to keep staff and customers safe. Home Performance saw a decline in participation early in the pandemic but was able to pick back up towards the end of the year. The AC rebate program saw little impact due to COVID-19.

Program Modifications/Terminations

In order to help customers adversely affected by the COVID-19 pandemic, APS implemented temporary increases to incentive levels for emergency HVAC replacements. These increased incentives are still in place and continued throughout the entire 2021 program year.

Other Significant Information

No other significant information to report.

MER Adjusted Gross MW and MWh Savings

Table 15 - MER Adjusted Gross MW and MWh Savings - Existing Homes Program

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Lighting				
Giveaway LEDs	11,340	510	11,730	0.1
In-Storage LEDs	NA	86	86	0.0
Marketplace LEDs	71,364	3,304	75,987	0.5
HVAC and Home Performance				
Home Energy Analyzer	23,480	3,085	3,085	4.7
Smart Thermostats	35,179	3,115	31,153	12.0
Water Heater Timers	8	0	0	0.0
AC with Quality Installation	6,168	7,410	111,145	4.7
Audits	1,008	0	0	0.0
Western Cool Control	1	1	5	0.0
Duct Repair	1,019	962	17,324	0.6
Direct install LED	5,040	295	4,425	0.0
Insulation	737	1,639	40,973	0.6
Low Flow Shower Heads	1,008	76	760	0.0
TOTAL	**156,352**	**20,483**	**296,673**	**23.2**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

B. Residential New Home Construction

Description

This program promotes high-efficiency construction practices for new residential homes. It offers incentives to builders that meet the program's EE requirements. The program emphasizes the whole building approach to improving EE and includes field testing of homes to ensure performance. Participating builders are trained to apply building science principles to assure that high-efficiency homes also have superior comfort and performance. The program also provides education for prospective homebuyers about the benefits of choosing an energy efficient home and the features to consider.

The program takes advantage of the national ENERGY STAR® brand name and promotes the U.S. Environmental Protection Agency (EPA) ENERGY STAR® label to prospective homebuyers.

Program Goals, Objectives, and Savings Targets

The program objective is to increase the penetration of homes built to high-efficiency standards. The rationale for this program is that residential new construction in the APS service territory, particularly the Phoenix metro area, has historically been one of the biggest drivers of APS's system load growth. It is more cost-effective to work with builders to implement efficient building practices at the time of construction rather than to attempt to retrofit efficiency after a home has been built. For many new home measures, such as building envelope improvements, the benefits of efficiency upgrades will be sustained for the life of the home to produce cost-effective savings.

This program also serves as conduit to encourage the adoption and installation of technologies that deliver energy and demand savings with a unique ability to shift energy use for additional customer and grid benefits. Participating Builders are also encouraged to construct homes with the duct work located in the conditioned envelope of the home, to deliver more savings and benefits, and to add electric vehicle (EV) prewired circuits in each home to encourage homebuyers to adopt and purchase zero emission electric vehicles.

Table 16 - Residential New Construction Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
16.5	24,434	478,046

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

During this Reporting Period, there were 72 homebuilders and 394 subdivisions actively participating in the program. The program currently includes ENERGY STAR® communities throughout the APS service territory, including the Phoenix metro area, Yuma, Casa Grande, Florence, Prescott, Verde Valley, and Flagstaff.

Specifically, in 2021 APS paid builder incentives for the following:

- 6,785 ENERGY STAR® Version 3.0 Homes
- 9,140 Smart Thermostats
- 1,198 Ducts in Conditioned Space
- 169 EV Pre-Wires

Evaluation/Monitoring Activities and Research Results

- Reviewed and updated Residential New Construction (RNC) measure analysis spreadsheet and analytic database for ENERGY STAR® Homes V3.0.
- Reviewed and updated RNC measure analysis spreadsheet and the analytic database for Ducts in Conditioned Space measure.
- Developed a new measure analysis spreadsheet for an all-electric home for implementation planning.
- Supported data requirements of implementation tracking system to meet evaluation needs.
- Supported development of the new RNC database to ensure data needs are met for evaluation purposes.
- Analyzed and visualized the RNC data using Power BI to understand the program progress and inform future energy model updates.
- Developed discussion guides and fielded a survey to assess builder experience for program improvements and to assist with new staffing considerations.
- Researched and calculated iDSM savings additions to smart thermostats and connected water heater measures.
- Held monthly meetings with RNC program manager to coordinate on evaluation activities and updates to measure-level savings and costs to accurately track and report program achievements.
- Created a uniform workpaper template for savings reporting and verification.

Consumer Education and Outreach

Program marketing and education efforts during this Reporting Period include the following:

- 2021 Home Builder Association of Central AZ (HBACA) Member Directory – print ad to promote the APS ENERGY STAR® Home program to builders.
- HBACA Website Ad.
- HBACA Southwest Builder Show – APS sponsored the Industry Forecast luncheon, where leading economists and featured builders provided attendees an outlook on what they see coming up in 2022 and beyond in the real estate business.
- Sponsor for the HBACA Sticks and Bricks golf tournament.
- Sponsored and received ad placement in the HBACA Major Achievements in Merchandising Excellence Awards event.
- aps.com website presence.
- Training classes titled "Finding the Hidden Value in the Homes You Sell" that are offered to the Real-estate agent community to promote the value of energy efficient construction.
- "Ducts in Conditioned Space" Builder Training was held to train builders on the techniques to install duct work within the conditioned envelope of the home.

Problems Encountered and Proposed Solutions

No problems to report during this Reporting Period.

Program Modifications/Terminations

The EV Prewire, Connected Water Heater and Ducts in Conditioned Space measures were launched to builders in this Reporting Period.

Other Significant Information

There is no other significant information to report during this Reporting Period.

MER Adjusted Gross MW and MWh Savings

Table 17 - MER Adjusted Gross MW and MWh Savings - Residential New Construction Program

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
APS ENERGY STAR® Homes V3.0	6,785	15,102	302,038	7.7
Ducts in Conditioned Space	1,198	669	13,382	0.3
Connected Water Heaters	0	0	0	0.0
Smart Thermostats	9,140	810	8,099	3.5
EV - Prewire	169	0	0	0.0
TOTAL	**17,292**	**16,581**	**323,519**	**11.5**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

C. Residential Conservation Behavior Program

Description

The Residential Conservation Behavior program, delivered in partnership with Oracle OPower, is made up of several interrelated customer offerings. Home Energy Reports (HERs) provide energy savings and education for participating customers through regularly executed printed and digital reports. These personalized reports are designed to motivate measurable savings in energy usage by driving conservation behavior. The HERs compare participant usage with similar homes and provide customized tips for reducing or shifting energy usage. Based on best practices and research in behavioral science, the reports compare participants' energy use to efficient similar homes for their profile and provide a benchmark for comparison. This has proven to be an effective way to raise awareness of home energy use and achieve sustainable behavior changes. Customers can opt out of the program at any time. During 2021, APS worked with Oracle OPower to launch important equity improvements: in May, APS launched customized tips for low- and moderate-income households receiving HERs, and in June the Company launched a Spanish language version of the HERs.

APS launched "plan coaches" in 2021: the Plan Coach products are weekly digital communications to inform customers how small changes in energy usage can realize energy

and monetary savings on their specific rate plan. Content evolves over time and includes week-over-week energy usage updates and new tips that explain how to shift or reduce their most consequential energy usage. The time-of-use (TOU) rate Plan Coach was launched in February 2021 (and expanded to all eligible TOU customers in September 2021), and the fixed rate Plan Coach launched in October 2021. The Demand Plan Coach will launch in 2022, once all demand rate migrations are complete. Not only do Plan Coach products support customer education and savings goals, helping customers get the most out of their rate plans, but TOU and Demand Plan Coach also support the APS Clean Energy Commitment to provide 100% carbon-free energy by 2050, because they drive on-peak demand savings and shift energy usage to midday periods when solar energy is abundant.

Program Goals, Objectives, and Savings Targets

The goal of this program is to motivate participants to change their behavior and reduce and/or shift their home energy usage. Results for Peak Demand (MW), Annual Energy Savings (MWh) and Lifetime Energy Savings (MWh) are projected, measured, and reported.

Table 18 - Conservation Behavior Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
24.2	71,615	71,615

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

The 2021 Conservation Behavior program consisted of quarterly print HERs and monthly email reports (January–December) targeting approximately 300,000 customers. During 2021, a total of 1,250,121 email reports and 1,042,835 printed reports were dispatched (includes Spanish reports). In the same Reporting Period, 2,575,649 TOU Plan Coach and 228,253 fixed energy charge Plan Coach emails were sent. Just over 35,000 customers visited NextWeb for energy usage information and tips.

Evaluation/Monitoring Activities and Research Results

- Reviewed and updated program Measure Analysis Spreadsheets and Analytic Database.
- Began review of the Plan Coach to measure peak load-shifting.

Consumer Education and Outreach

- Participants receive print/email HERs with increased frequency during the hotter summer months. The reports provide energy usage benchmarks and customized energy management tips to educate customers and help them reduce consumption and save money.
- Participants have access to NextWeb, a portal that provides even greater insight into usage, comparisons (both personal and with similar homes), and a variety of energy savings tips.
- APS advisors have access to a portal where they can view the HERs for participating customers and discuss the information with customers as needed.

Problems Encountered and Proposed Solutions

No problems to report during this Reporting Period.

Other Significant Information

Behavioral conservation is an important program that provides education and awareness and drives participation in other DSM programs and energy savings opportunities. In addition to conservation behavior savings, this program promotes other APS account management programs and customer self-service tools (i.e., APS Marketplace, smart thermostats).

MER Adjusted Gross MW and MWh Savings

Table 19 - MER Adjusted Gross MW and MWh Savings - Conservation Behavior Program

Measure	# Participants	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Conservation Behavior Program	464,053	45,149	45,149	42.6
TOTAL	**464,053**	**45,149**	**45,149**	**42.6**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

D. Multi-Family Energy Efficiency Program

Description

The Multi-Family Energy Efficiency Program (MEEP) encourages DSM improvements in multi-family complexes within the APS service territory.

MEEP uses a four-track approach to promote EE within the multi-family market segment.

- Track 1 – Provides free direct install measures to retrofit the residential dwellings of existing communities. Multi-family facility personnel and/or contractor/Trade Allies conduct all direct install installations.
- Track 2 – Provides complementary energy assessments of the community common area commercial facilities and a sampling of residential floorplans. The energy assessment identifies opportunities for additional DSM savings and the applicable incentives and/or free direct install measures that are available.
- Track 3 – Targets new construction and major renovation multi-family projects. This track builds from the success of the APS ENERGY STAR® New Homes program and encourages energy efficient building principles by paying an incentive to builders on a per unit basis for building to the standard outlined in a New Construction Builder Package.
- Track 4 – Offers an incentive to multi-family communities that are replacing their existing HVAC systems and install their new system according to the APS Quality Install requirements.

Program Goals, Objectives, and Savings Targets

- Reduce peak demand and overall energy consumption in the multi-family housing market segment.

- Promote existing community efficiency retrofits of both dwelling units and common areas.
- Promote higher efficiency construction standards in the development of new multi-family projects.
- Increase overall awareness about the importance and benefits of energy improvements to the landlord and property ownership community.

Table 20 - Multi-Family Energy Efficiency Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
2.8	5,151	98,723

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

A total of 33 multi-family properties participated in the direct install program in 2021 totaling 4,026 apartment dwellings. In total there were 54,724 LEDs, 36 Connected Water Heater Controls, 255 Smart Thermostats, and 0 HVAC Quality Installs in multi-family dwellings. A total of 64 energy assessments were performed for the multi-family communities in 2021.

The multi-family new construction/major renovation program saw 12 projects participate in 2021. A total of 1,070 units and 6 Connected Water Heaters received rebates in 2021.

During this Reporting Period, 37 multi-family common area projects were paid from and reported in the Non-Residential Existing Facilities program. APS paid incentives on 37 multi-family common area customer applications from 19 unique customers totaling $131,681 in prescriptive and custom incentives during this Reporting Period. These projects resulted in 4,832 MWh of annual savings, 55,997 MWh of lifetime energy savings and a peak demand savings of 0.29 MW.

Evaluation/Monitoring Activities and Research Results

- Reviewed and updated program measure analysis spreadsheets and analytic database for nine active measures.
- Reviewed implementation program tracking database and supporting HERs rating documentation to refine savings assumptions.
- Coordinated with the program manager and the new implementation contractor to streamline the implementation transition by providing and updating the measure analysis spreadsheets and analytic database.
- Evaluated the impacts and characterized the customer experience for Armada Power connected water heater load shifting research pilot.
- Held monthly meetings with APS program manager to coordinate on evaluation activities and updates to measure-level savings and costs to accurately track and report program achievements.
- Researched and calculated iDSM savings additions to rate optimized smart thermostats, water heater timers, and grid tied electric resistance water heater measures.
- Created a uniform workpaper template for savings reporting and verification.

Consumer Education and Outreach

- Distributed MEEP brochures and Rebate Quick Look via digital documents to customers. Utilized virtual outreach to get program messaging out in the Marketplace and to secure many of the program participants.
- Maintained a presence on aps.com to give customers a point of reference for all program information.
- Provided educational leave behind materials promoting energy savings to communities that were retrofitted.
- Conducted virtual presentations to community managers.
- Conducted virtual facility assessments.

Problems Encountered and Proposed Solutions

No problems to report during this Reporting Period.

Program Modifications/Terminations

No program modifications were made during this Reporting Period.

MEEP New Construction Optional Measures Installed

In Commission Decision No. 73089, APS was directed to report the number and type of optional measures that builders/developers are choosing to install, as well as energy savings, coincident demand savings, and actual cost for each optional measure selected by multi-family new construction participants.

A total of 12 multi-family new construction projects received rebates in 2021. Eleven projects were rebated through the performance path, one project was rebated through the prescriptive path. The performance path allows builders or developers of multi-family new construction projects to use any building design to reach program compliance as long as the building's performance, when tested by a certified HERs rater, meets the minimum performance HERs score. Thus, performance path projects do not select optional items from the prescriptive list.

MER Adjusted Gross MW and MWh Savings

Table 21 - MER Adjusted Gross MW and MWh Savings - Multi-Family Energy Efficiency Program

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Connected Water Heaters	6	0	0	0.0
Connected Water Heater Controls	36	0	0	0.1
Direct Install LEDs	54,724	3,203	48,043	0.3
Smart Thermostats	255	23	226	0.2
HVAC Quality Install	0	0	0	0.0
NC Builder Package	1,070	2,139	53,480	0.6
TOTAL	**56,091**	**5,365**	**101,749**	**1.2**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Other Significant Information

During this Reporting Period, MEEP completed a pilot test of connected water heater controls within a multi-family community. Forty water heater controllers were installed and evaluated to test the technologies' performance in a real-world environment. Additionally, this pilot was conducted to develop installation processes and lessons learned for best practice deployment. APS third-party evaluator Guidehouse conducted impact analysis on the performance of the water heaters and a customer impact analysis was conducted to gauge customer experiences. A workpaper is being provided to Staff that shows measured savings and demand results.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

E. Energy Wise Limited-Income Weatherization

Description

APS's Energy Wise Limited-Income Weatherization Assistance program is designed to improve the efficiency, safety and health attributes of homes for customers whose income falls within the defined federal poverty guidelines. This program serves limited-income customers with various home improvements including cooling system repair and replacement, insulation, sunscreens, water heaters, window repairs and improvements, as well as other general repairs.

Per Commission Decision No. 68647, the program is conducted in accordance with the rules of the federal Weatherization Assistance Program (WAP). WAP incorporates a performance-based energy audit procedure that focuses on optimizing investment in EE through a systems approach. Participating agencies utilize a Department of Energy site-specific energy audit procedure that ensures that the overall Savings to Investment Ratio (SIR) for the entire package of materials/measures including the cost of incidental repairs is greater or equal to one.

In addition, participating agencies also use a prescriptive priority list developed by the Arizona Department of Housing to determine which cost-effective measures to install. There is also a multi-family housing component designed to extend the benefits of weatherization to these types of complexes. The program is administered by various community action agencies throughout APS's service territory.

Program Goals, Objectives, and Savings Targets

- To improve the efficiency of homes for customers whose income falls within the defined federal poverty guidelines.
- To provide customers information on energy management and conservation.

Table 22 - Limited-Income Weatherization Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
1.8	3,559	64,066

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

A total of 835 households received assistance during the Reporting Period. A single household may have received more than one type of assistance.

Evaluation/Monitoring Activities and Research Results

- Reviewed and updated program measure analysis spreadsheets and analytic database.
- Conducted ongoing tracking and review of program participation data.

Consumer Education and Outreach

- Participated in Arizona Department of Housing State Weatherization Policy Advisory Committee meetings for developing the Department of Energy State plan.
- Participated in State Weatherization peer-to-peer meetings.

Problems Encountered and Proposed Solutions

Participation in the Hopi and Navajo communities was negatively impacted due to lengthy stay-at-home orders imposed in response to the COVID-19 pandemic.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

MER Adjusted Gross MW and MWh Savings

Table 23 - MER Adjusted Gross MW and MWh Savings - Limited-Income Weatherization

Measure	# Homes	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Weatherization	835	3,581	64,452	1.8
TOTAL	**835**	**3,581**	**64,452**	**1.8**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

The savings per home in this study are estimated to be 2.2 kW of peak demand savings and annual energy savings of 4,027 kWh at meter (4,288 kWh per home at generator), with an expected measure lifetime of 18 years.

Benefits and Net Benefits/Performance Incentive Calculation

The net benefits for this program are provided in Tables 6 and 8.

Costs Incurred

Costs incurred for this program during the current Reporting Period are listed below:

Commission Decision No. 73089 requires APS to report spending for non-EE measures in the Energy Wise Program. There were no non-EE measures or associated spending in this program during this time frame.

Table 24 - Cost Incurred - Limited-Income Weatherization

Activity	Incentives	Training & Technical Assistance	Consumer Education	Program Implementation	Program Marketing	Planning & Admin	Program Total Cost
Health & Safety	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Repair and Replace	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Weatherization	$ 7,479,103	$ 9,324	$ 352,202	$ 1,396	$ 2,086	$ -	$ 7,844,111
APS Program Support	$ -	$ -	$ -	$ -	$ -	$ 135,104	$ 135,104
Total	**$ 7,479,103**	**$ 9,324**	**$ 352,202**	**$ 1,396**	**$ 2,086**	**$ 135,104**	**$ 7,979,215**

Note: This table displays all Energy Wise Program costs, including Health and Safety, and Repair and Replace. However, these categories are not included in Table 2.

F. Residential Battery Pilot

Description

The Residential Battery pilot (Pilot) supports the adoption of customer-sited, behind-the-meter distributed energy storage systems that can provide a wide variety of benefits to the

grid. The Pilot will help APS learn about battery performance in a variety of conditions and how batteries may create value for customers through improved management of energy use at their residence while also helping reduce stress on the electric grid. The Pilot pays incentives for customers participating at either of the two possible participation levels.

Option 1: Data Only - Customers who choose the Data Only option agree to share their battery system performance data with APS and are eligible for an incentive of $500 per installed kW of battery capacity, with a maximum incentive of $2,500 per home.

Option 2: Data and Battery Management - With the Data and Battery Management option, the customer agrees to give APS access to data associated with the battery system and share up to 80% of the battery system's capacity for a maximum of 100 events a year. The customer is eligible for an incentive of $500 per installed kW (up to $2,500 per home) for installed battery capacity plus an additional $1,250, with a maximum incentive of $3,750 per home.

Both are a one-time upfront incentive paid to customer when their battery systems are approved by APS for interconnection and receive the permission to operate.

Additionally, customers that are adding batteries to existing solar systems, and who are grandfathered net metering customers, shall be entitled to retain their grandfathered status, Resource Comparison Proxy (RCP) and rate plan.

Program Goals, Objectives, and Savings Targets

The Pilot's objective is to create a network of participating batteries that will commit to dispatch during peak hours, and to share battery performance data to provide flexible distributed capacity value and inform future efforts to scale distributed energy storage capacity on the grid.

Table 25 - Residential Battery Pilot Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
2.5	-	-

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

The Pilot was launched in October 2021 and recorded no customer participation during this Reporting Period. The Pilot currently has two participating battery partners (EnPhase and SolarEdge) with more battery partners being added soon.

Evaluation/Monitoring Activities and Research Results

- No MER activities were undertaken during this Reporting Period.
- Engaged third-party evaluator to do a market analysis of other utilities and programs across the U.S. on residential battery programs to assist with Pilot design.

Consumer Education and Outreach

No pilot consumer education activities were conducted during this Reporting Period.

Outreach activities include:

- DSM stakeholder update meetings and email notifications.
- Renewable energy stakeholder and installer update meetings and email notifications.

Problems Encountered and Proposed Solutions

No problems to report during this Reporting Period.

Program Modifications/Terminations

A battery management participation option was added for customers and a control strategy designed to orchestrate events that will call on battery systems to discharge for up to four hours per event.

Other Significant Information

There is no other significant information to report during this Reporting Period.

MER Adjusted Gross MW and MWh Savings

There are no energy or demand savings to report during this Reporting Period.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Table 26 - MER Adjusted Gross MW and MWh Savings - Residential Battery Pilot

Measure	# Participants	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
RES Pilot	0	0	0	0.0
TOTAL	**0**	**0**	**0**	**0.0**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

V. Non-Residential Programs

A. Existing Facilities

Description

The Existing Facilities program provides prescriptive incentives for owners and operators of non-residential facilities of all sizes to promote efficiency improvements in technologies such as HVAC, HVAC controls and variable speed drive applications. For efficiency applications not covered by the prescriptive incentives, the program offers custom incentives that are evaluated individually based on energy savings. The program also provides incentives to reduce the cost of an energy study that identifies energy saving, energy storage and load shifting opportunities. The program provides educational and promotional materials designed to assist facility and business owners and operators in making decisions to improve the performance of their facilities.

During stakeholder meetings, participants requested that APS continue to provide reporting on small business (≤100 kW of aggregated peak monthly demand) participation in the program. The small business results (included in the Existing Facilities results) are provided below.

Program Goals, Objectives, and Savings Targets

- Promote and support DSM opportunities for existing non-residential customers.
- Promote the installation of high-efficiency technologies including, but not limited to, HVAC equipment, HVAC controls and variable speed drives.
- Promote market transformation through APS Trade Allies and customer outreach.

Table 27 - Existing Facilities Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
26.5	133,568	1,906,975

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

During this Reporting Period, APS paid $3,927,799 in incentives. This figure represents a total of 540 paid applications from 199 unique customers. Payments to school districts and charter schools comprised zero of the 540 applications.

During this Reporting Period, 71 small business projects were paid, with zero applications from school districts. APS paid incentives on 71 small business customer applications from 54 unique customers totaling $115,519 in prescriptive and custom incentives during this Reporting Period. These projects resulted in 4,251 MWh of annual savings, 55,352 MWh of lifetime energy saving and a peak demand savings of 0.28 MW.

Pursuant to Decision No. 75323, APS provided notice that it was going to offer the same cost-effective DSM measures offered in the Schools Program to qualifying non-profit community organizations effective April 1, 2020. The non-profit results (included in the Existing Facilities results) are provided below.

During this Reporting Period, APS paid incentives on nine non-profit customer applications from nine unique customers totaling $79,958 in prescriptive and custom incentives These projects resulted in 1,240 MWh of annual savings, 22,223 MWh of lifetime energy savings and a peak demand savings of 0.49 MW.

Table 28 - Existing Facilities Program Incentives Paid

Incentive Status by Fund for Paid Applications	Incentives Paid
Existing Facilities – Prescriptive & Custom	$3,911,054
Existing Facilities – Studies	$16,745
Existing Facilities – Retro-Commissioning Studies	$0
Total Existing Facilities Funds	**$3,927,799**

Commission Decision No. 70637, requires APS to track DSM customer applications resulting from studies for which incentives have been paid and to report results to the Commission. During this Reporting Period, APS paid incentives for eight study applications from seven customers including five feasibility studies, one ENERGY STAR® Benchmark and two HVAC Assessments. One of the studies resulted in implementation of the associated measures. Since the program's inception, 549 studies have been completed. Of those studies, 220 have resulted in EE project applications to date.

There were zero study incentives paid to small business customers during this Reporting Period. Twenty-one studies have been completed since program inception, of which eight study applications have resulted in EE projects for small businesses. These projects are included in the Existing Facilities program totals above.

Commission Decision No. 73089, requires APS to report the type of measures installed by customers after a study was completed. The following measure was installed for studies completed in 2021: programmable thermostats.

Evaluation/Monitoring Activities and Research Results

- Conducted customer interviews to assess effectiveness of in-person and virtual energy assessments.
- Conducted research to update energy and demand impacts, load shapes, and incremental costs for 28 existing and new measures to support the 2022 implementation plan.
- Held monthly meetings with program manager to coordinate on evaluation activities and updates to measure-level savings and costs to accurately track and report program achievements.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Provided the implementation contractor the avoided costs, line loss factors, capacity reserve, and discount rates quarterly to support the implementation ensuring correct numbers are used to calculate societal benefits for the non-residential programs.
- Researched and calculated iDSM savings additions to EMS and high frequency battery charger measures.
- Continued research to update load shifting potential and incremental costs for various HVAC thermal energy storage products in non-residential applications.
- Conducted research to update energy and demand impacts, load shapes and incremental costs for existing measures to support the 2021 DSM Plan. The existing measures include air-cooled chiller, water-cooled chiller, packaged/split AC/HP, smart thermostat, programmable thermostat, networked thermostat, EMS, variable speed drive (VSD), cool control, heat pump water heaters, outside LED, lighting power density, LED lamps with reflector, LED lamps without reflector, MR-16 LED lamps, refrigerated case LED, strip curtains on walk-ins, computer power management-laptop, packaged terminal AC/HP, and mini-split AC/HP.

Consumer Education and Outreach

Outreach activities for the Existing Facilities program focused on responding to customer requests, working to educate customers through industry associations, community organizations, Trade Ally partners, and providing project application support to customers and Trade Allies who have installed energy-efficient equipment in their facilities. During the

Reporting Period, the Solutions for Business program team participated in the following meetings (estimated attendance included):

- January 6 City of Phoenix (8)
- January 6 C G Lubeck (2)
- January 7 Sky Harbor Phoenix Electrical Upgrades Project (2)
- January 12 USMC Yuma (4)
- January 13 Updates to US Travel Association (Virtual attendance numbers not available)
- January 14 West Coast Automation (2)
- January 18 Compass Data Center (4)
- January 19 Hopi Tribe Economic Development Corporation (4)
- January 22 Project Jomi (5)
- January 22 Lucid Motors (2)
- January 25 Dole Yuma (4)
- January 26 City of Avondale (3)
- January 27 US Travel Association State of the Industry (120)
- January 27 Anderson Window (2)
- January 29 Stockdale Management (4)
- February 2 Andersen Corporation Goodyear (4)
- February 3 City of Scottsdale Water Department (2)
- February 10 2600 N. Central (5)
- February 11 Crescent Crown EMS Project (4)
- February 12 Going Green and Going Smart Live Session (6)
- February 18 Ferrarra USA (3)
- February 25 Greater Phoenix Economic Council Regional Report: Planes and Cranes (120)
- March 1 IFMA (50)
- March 4 Sands Chevrolet (6)
- March 5 Cold Summit (7)
- March 9 Petsmart (3)
- March 10 Ferrarra USA (3)
- March 15 IES Ventures (3)
- March 17 7x24 Exchange Arizona Chapter - Data Center Market Discussion (Virtual attendance numbers not available)
- March 22 Paradise Valley USD (2)
- March 24 Lucid Motors (2)
- March 25 Arizona Hotel & Lodging Association- Tourism Talk: Road to Recovery for the Hospitality Industry (Virtual attendance numbers not available)
- March 31 United Parcel Service (2)
- April 6-8 AZ Water Conference (Virtual attendance numbers not available)
- April 8 AEE April Luncheon (6)
- April 9 Print Pack (4)
- April 9 Amazon.com (2)
- April 14 City of Peoria (4)
- April 16 Nikola Motor Company (2)
- April 21 BOMA - April Industry Luncheon (Virtual attendance numbers not available)

- April 26 Fresh Start Women's Foundation (2)
- April 27 Phoenix Heat Treating 6)
- April 29 Transwestern (5)
- April 30 Prescott Center of the Arts (11)
- May 4 Cold Summit (5)
- May 5 Electric League of Arizona - Building Operators Program (8)
- May 10 Coyote Ice Den Scottsdale (3)
- May 11 City of El Mirage (4)
- May 11 City of Phoenix Water (7)
- May 11 Nikola Motor Company (3)
- May 13 Greater Phoenix Economic Council (120)
- May 14 Stream Data Centers (4)
- May 20 Maricopa County (2)
- May 21 FM Industries (3)
- May 25 Holbrook School District (4)
- June 2 Iron Mountain (2)
- June 3 Buckeye Elementary School District (3)
- June 21 AZDOT (3)
- June 23 7x24 Exchange Arizona Chapter Quarterly Meeting (42)
- June 24 US Travel Association - Let's Meet Their Coalition (80)
- June 29 Aligned Energy (3)
- June 30 Mayo Clinic (6)
- June 30 Purina (5)
- July 7 City of Scottsdale (4)
- July 7 Dole Yuma (5)
- July 9 Shamrock Foods (2)
- July 12 City of Scottsdale Street Light Division (3)
- July 14 Grand Canyon – Xanterra (3)
- July 15 City of Phoenix Cave Creek WRP (6)
- July 19 City of Winslow (4)
- July 20 AZ Hotel Group (3)
- July 21-23 AASBO Summer Convention (500+)
- July 26-28 AHCA 2021 Annual Conference (500+)
- July 29 Associated Minority Contractors of Arizona (50)
- July 29 Lucid Motors (4)
- July 30 Cold Summit (5)
- August 4 Performance Capital Partners (2)
- August 11 Compass Data Center (3)
- August 12 Scottsdale Plaza Resort - Highgate Hotels (3)
- August 26 Buckeye Elementary School District (4)
- August 31 Greater Phoenix Economic Council (GPEC) (176)
- September 1 ASU (2)
- September 1 Deer Valley Unified School District (2)
- September 3 Iron Mountain (2)
- September 7 Washington Elementary School District (2)
- September 8 Nikola Motor Company (2)
- September 10 Prologis (2)
- September 13 St. Francis Xavier (3)
- September 14 ASU (5)

- September 14 U.S. Travel Association - Funding Recovery & Beyond (100)
- September 14 KeHe Refrigerated Warehouse (3)
- September 14 Compass Data Center (3)
- September 17 Northern Arizona University (3)
- September 27 Prologis (5)
- September 28 Compass Data Center (2)
- October 4 Lucid Motors (3)
- October 13 2600 N Central (3)
- October 14 QuikTrip (2)
- October 19 Arizona State University (6)
- October 20 Buckskin Sanitation (3)
- October 21 Abbott Laboratories (5)
- October 22 American Express (3)
- October 26 2021 Public Works Conference (131)
- October 26 ASU Capital Projects Management Group (CPMG) (30)
- October 28 Greater Phoenix Economic Council (50)
- November 17 GPEC Virtual Convening the Community (50)
- November 17 Renaissance Square (4)
- November 18 KeHe Refrigerated Warehouse (3)
- November 23 ASU (3)
- December 1 Greater Phoenix Economic Council (50)
- December 2 BEX Events - Higher Education (100)
- December 8 Museum of Northern Arizona (3)
- December 9 Coconino Community College (3)

Customer Awareness and Advertising

In 2021, the program continued to focus on educating customers on energy management best practices and helping them make informed buying decisions. This was done through traditional marketing channels, and free energy assessments for customers interested in learning how their facility uses energy. Energy management best practices, as well as rebates and program services, were communicated to non-residential customers through bill inserts, newsletters, bill messages, paid digital, and email.

Onsite energy assessments were introduced in 2019. In 2021 due to COVID-19, only virtual phone interview energy assessments were conducted. Upon request, a program representative meets with the customer to discuss their energy use and sustainability goals. A joint walkthrough (onsite or virtual) of the facility allows for detailed discussion regarding operations and opportunities to improve efficiencies. Customers are presented with a comprehensive report outlining their current usage and no- and low-cost energy savings opportunities. It further details opportunities for equipment/system upgrades and rate optimization. During this Reporting Period, 36 large business customers and 137 small business customers, including 29 non-profits, took advantage of this service.

Technical Training

Training courses help customers and Trade Allies understand technologies and their potential for energy savings. This understanding promotes quicker adoption of EE technologies and encourages customers to undertake a more in-depth, holistic approach to energy management and sustainability. Feedback from this educational series indicates that customers are more likely to adopt EE technologies following participation in training classes due to the knowledge gained from them.

APS continued to work closely with the Arizona Chapter of the Association of Energy Engineers (AEE-AZ) to promote and develop content for the APS Technical Training series. Classes have historically been full-day, in-person events. It can be difficult for customers to commit to full day events, so in May 2019 APS began offering free, one-hour webinars. This has significantly increased participation, particularly in rural parts of the state.

Due to COVID-19, scheduled in-person trainings were not held in 2021. Webinars held during 2021 attracted 992 participants due to their flexible nature (estimated attendance included):

- January 13 RTU and Chiller Maintenance for Maximum Efficiency (48)
- January 27 Energy Efficiency for Commercial Customers (55)
- February 10 Water & Wastewater Energy Savings (38)
- February 24 Keep Your Cool! HVAC Basics (65)
- March 10 Better Together: Energy Efficiency and Public Assembly Buildings (18)
- March 24 S4B and MEEP Trade Ally Webinar (124)
- April 7 Peak Demand Management (51)
- April 21 APS Energy Information Services (32)
- May 19 EV technology and Your Business (46)
- June 9 Ventilation Fans (29)
- June 23 Electricity Is Shaping the World: Industrial Process Electro Technologies (17)
- July 14 Variable Frequency Drives (46)
- July 28 Variable Refrigerant Flow HVAC (42)
- August 11 Converting Energy Audits into a Business Plan (43)
- August 25 Dehumidification Solutions (38)
- September 15 Commissioning Best Practices (43)
- September 29 APS - S4B and MEEP Trade Ally Webinar (120)
- October 13 Better Performance with Building Automation Systems (26)
- October 27 Refrigeration Energy Efficiency (34)
- November 10 Saving Energy Dollars with Heat Recovery (27)
- December 1 Hidden in Plain Sight: Building Envelope Performance (30)
- December 15 What's New in Lighting? [latest lighting technologies/trends] (20)

Commission Decision No. 73089 requires APS to report Energy Management System (EMS) and LED measures, annual savings, capacity savings, and measure life individually. *See* Table below.

Table 29 - Existing Facilities Program Measures

Measure	Quantity	kWh Savings	kW Savings	Measure Life
EMS - DDC Replacing Pneumatic or Manual T-stat	754,225 sq. ft.	3,337,004	870	15
EMS - DDC Replacing Programmable T-stat or digital system	4,082,451 sq. ft.	15,023,646	3,916	15
EMS - Integrated Lighting Control	436,863 sq.ft.	850,934	285	15
LED - non-reflector	7,129	1,313,815	273	7
LED - reflector	1,840	351,259	73	7
LED - MR16	867	124,014	26	7
Linear LED 2 Foot	4,670	136,400	26	17
Linear LED 3 Foot	281	13,951	3	17
Linear LED 4 Foot	123,951	6,320,543	1,421	17
Linear LED 8 Foot	658	49,622	10	17
Outdoor LED Watts <= 50	13,915	9,052,039	0	12
Outdoor LED Watts >50 & <300	7,438	13,423,932	0	15
Outdoor LED Watts >300	183	687,389	0	20
Refrigerated Case LED - No Sensors	2,928	1,707,964	371	8
Refrigerated Case LED - With Sensors	173	113,893	25	8

*Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Commission Decision No. 68488 requires APS inform Commission Staff when incentives are paid out that exceeded 50% of the incremental cost of the measure. During 2021, the following measures were paid that exceeded 50% of incremental cost: Enhanced HVAC, Packaged Terminal AC, Custom, Networked thermostats, LED lamps with no reflector, High-Efficiency Evaporator Fan Motors, High-Efficiency Freezers.

Problems Encountered and Proposed Solutions

The presence of COVID-19 during most of the program year affected implementation in a number of ways. Outreach efforts were transitioned to all virtual meetings to keep customers, staff and Trade Allies safe.

Program Modifications/Terminations

APS submitted a 60-day notice on September 1, 2021 to adjust incentives for non-residential measures effective November 1, 2021. Measures that were adjusted include Variable Speed Drives, outdoor LEDs, LED lamps with no reflector, Hotel Room Occupancy Controls, Networked Thermostats, Packaged Terminal AC & HP and Enhanced HVAC.

Freeport-McMoRan Opt-Out Provision

Commission Decision No. 74813 exempted Freeport-McMoRan from paying into the Demand Side Management Adjustment Charge (DSMAC) and participating in the Solutions for Business program for their Bagdad mine. It was further ordered by the Commission that Freeport-McMoRan continue to obtain and report EE activities and savings on an annual basis for their Bagdad mine. During this Reporting Period, Freeport-McMoRan reported installing high-efficiency motors, VSDs and LED lighting. Based upon the information provided by Freeport-McMoRan, APS estimates that the Freeport-McMoRan Bagdad mine saved approximately 3,340 MWh annually. As ordered, these savings from the Freeport-McMoRan Bagdad mine are not included in the savings values reported as part of the APS DSM portfolio.

Trade Allies

Trade Allies are contractors and other industry professionals who deliver DSM solutions to customers. Solutions for Business incorporates a Trade Ally program to ensure an informed

and engaged network of service providers work with APS's customers. To be listed as a Solutions for Business Trade Ally, a company must submit an application and attend program training. In-house Trade Ally training is provided, which consists of educating contractors on utilization and promotion of the program. To remain on the list, the company must direct projects to the Solutions for Business program. Additionally, each Trade Ally must provide good customer service and represent the Solutions for Business program in accordance with the APS Solutions for Business Policies and Procedures. Recruitment is conducted through strategic partnerships within the energy and contracting industry as well as trade show and event participation.

Due to COVID-19 restrictions, the Company's opportunities to host in-person orientations were limited. In addition to the training classes, the program participated in the following Trade Ally-focused virtual events (estimated attendance included):

- January 7 S3 Energy Group LLC (4)
- January 18 Trane (2)
- February 11 Transformative Wave - Crescent Crown EMS Project (4)
- February 16 Quest Energy (2)
- February 17 Voss Lighting (2)
- February 26 Peak + (5)
- March 1 M&M Lighting (2)
- March 24 S4B and MEEP Trade Ally Webinar (124)
- April 1 Schneider Electric (2)
- April 5 Lincus (3)
- April 8 Siemens (4)
- April 12 Tolin Mechanical (2)
- April 15 Verdant/Emerson (4)
- April 16 McCarthy Building Company (2)
- May 5 Climatec (7)
- May 13 E2O Energy Group (4)
- May 13 Day & Night (2)
- May 26 Quest Energy (4)
- June 10 EE Pros (2)
- June 25 Quest Energy (3)
- June 28 DPR (2)
- July 7 Yardi (4)
- August 10 E2O Energy Group (4)
- August 12 Day & Night (2)
- August 16 Canterra Lighting (2)
- August 25 Quest Energy (5)
- September 10 E2O Energy Group (2)
- September 14 ETC Group - KeHe Refrigerated Warehouse (3)
- September 29 APS - S4B and MEEP Trade Ally Webinar (120)
- October 21 Day & Night (2)
- November 1 Varitec (5)
- December 2 Arizona Control Specialist (2)

To help make it easier for Trade Allies to attend training that fits their schedule and improve their knowledge about DSM, Solutions for Business launched the APS Learning Hub in 2020. The Learning Hub is an electronic learning management system created to engage Trade Allies, support program initiatives, and provide resources to help customers make better energy-related decisions. The platform provides on-demand training to Trade Allies on DSM technical topics, tracks completion of the training, and allows for sending messages related to the Solutions for Business program. In addition, continued to maintain a Trade Ally portal, which provides technical insights, helpful tools, and industry trainings to an assortment of marketing resources.

Thirty-three new companies submitted applications, 80 individuals received training and 31 companies were approved to participate as Solutions for Business Trade Allies during the 2021 program year, bringing the total number of participating Trade Allies to 192 at the end of this Reporting Period.

MER Adjusted Gross MW and MWh Savings

The following table reflects the MER adjusted total energy and demand savings achievements in this Reporting Period for the Existing Facilities program. Only savings from projects that were completed and incentives paid are counted in this Progress Report.

Table 30 - MER Adjusted Gross MW and MWh Savings - Existing Facilities

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Existing Facilities	95,373	1,471,676	17.7
TOTAL	**95,373**	**1,471,676**	**17.7**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred During the Reporting Period

Cost information is provided in Tables 2b and 2c. In 2021, the Non-Residential New Construction measures saw significantly higher participation levels than anticipated. As a result, $3,347,105 were shifted from the Existing Facilities program as permitted within the current ACC budget shifting guidelines to fund these projects. Commission Decision No. 78164 established the Advanced Rooftop Controls pilot. As a result, $150,000 were shifted from the Existing Facilities program as permitted within the Commission's current budget shifting guidelines to fund these projects.

B. New Construction and Major Renovations

Description

The Non-Residential New Construction and Major Renovations program includes four elements: 1) Design Assistance and Feasibility Studies, 2) Custom measures, 3) Prescriptive measures, and 4) Whole Building applications. Design incentives involve efforts to integrate DSM into a customer's design process to influence equipment/systems selection and specification as early in the process as possible. Custom and prescriptive incentives are available for DSM improvements in HVAC, HVAC controls and VSDs. Whole Building applications are intended to promote integrated design strategies.

Pursuant to Decision No. 75323, APS provided notice that it was going to offer the same cost-effective DSM measures offered in the Schools Program to qualifying non-profit community

organizations effective April 1, 2020. The non-profit results (included in the New Construction and Major Renovations results) are provided below.

During this Reporting Period, APS paid incentives on one non-profit customer application from one unique customer totaling $8,347 in New Construction incentives. This project resulted in 87 MWh of annual savings, 1,153 MWh of lifetime energy savings and a peak demand savings of 0.02 MW.

Program Goals, Objectives, and Savings Targets

- Promote integrated design and analysis of alternative high-efficiency design packages through design assistance in new construction and major renovation applications.
- Assist the customer design team in examining alternative high-efficiency design packages through the provision of the design incentive.
- Promote market transformation through APS Trade Allies and customer outreach.

Table 31 - New Construction Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
3.8	12,699	198,697

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

In this Reporting Period, APS paid a total of $4,991,281 in New Construction incentives. This represents 106 applications from 59 unique customers. Zero of the 106 applications were from a school district.

Incentive status is provided below.

Table 32 - New Construction Program Incentives Paid

Incentive Status for Paid Applications	Incentives Paid
New Construction – Prescriptive & Custom	$4,948,252
New Construction – Studies	$43,600
Total New Construction Funds	**$4,991,852**

Commission Decision No. 70637 required APS to continue tracking DSM customer applications resulting from studies for paid incentives and report the semi-annual and cumulative results of its program-to-date tracking efforts. During this Reporting Period, six design assistance studies were paid for a total cost of $43,600. Four applications have resulted in DSM projects to date. Since program inception, 135 studies have been completed. Of those 135 studies, 84 resulted in applications for DSM projects.

Commission Decision No. 73089 requires APS to report the type of measures installed subsequent to the receipt of study or design assistance incentives. The following measures were installed for studies completed in 2021: Air- and water-cooled chillers, lighting power density, variable speed drives, split HVAC systems, and high-performance window glazing, compared to the ASHRAE 90.1 2013 baseline. These measures were submitted through the New Construction prescriptive program.

APS Solutions for Business launched the Whole Building incentive in January 2010. During this Reporting Period, the program received zero Whole Building pre-notification applications and zero Whole Building final-notification applications; and zero Whole Building projects were paid incentives.

Evaluation/Monitoring Activities and Research Results

- Conducted customer interviews to assess effectiveness of in-person and virtual energy assessments.
- Conducted research to update energy and demand impacts, load shapes, and incremental costs for 28 existing and new measures to support the 2022 implementation plan.
- Held monthly meetings with program manager to coordinate on evaluation activities and updates to measure-level savings and costs to accurately track and report program achievements.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Provided the implementation contractor the avoided costs, line loss factors, capacity reserve, and discount rates quarterly to support the implementation ensuring correct numbers are used to calculate societal benefits for the non-residential programs.
- Researched and calculated iDSM savings additions to EMS and high frequency battery charger measures.

Consumer Education and Outreach

In addition to the marketing and outreach activities described for the Existing Facilities program, outreach activities for the New Construction program included responding to customer requests, attending customer meetings, and working with Trade Allies, industry professionals and customers on their New Construction and Whole Building project applications.

Due to COVID-19 restrictions during this Reporting Period, meetings transitioned from an in-person to virtual format. These meetings included (with estimated attendance):

- February 10 CASHE February Monthly Meeting (31)
- February 25 Greater Phoenix Economic Council Regional Report: Planes & Cranes (120)
- March 1 IFMA (50)
- March 10 CASHE March Monthly Meeting (35)
- March 17 7x24 Exchange Arizona Chapter - Data Center Market Discussion (virtual meeting, attendance not provided)
- April 8 AEE April Luncheon (6)
- April 14 CASHE March Monthly Meeting (33)
- April 21 BOMA - April Industry Luncheon (virtual meeting, attendance not provided)
- May 5 Building Operators Program, Electric League of Arizona (8)
- May 13 Greater Phoenix Economic Council (120)
- May 13 CASHE May Monthly Meeting (35)
- June 23 7x24 Exchange Arizona Chapter Quarterly Meeting (42)
- July 14 CASHE July Meeting (39)
- July 26-28 AHCA 2021 Annual Conference (500+)

- July 29 Associated Minority Contractors of Arizona (50)
- August 31 Greater Phoenix Economic Council (GPEC) (176)
- October 26 2021 Public Works Conference (131)
- October 28 Greater Phoenix Economic Council (50)
- November 17 GPEC Virtual Convening the Community (50)
- December 1 Greater Phoenix Economic Council (50)
- December 2 BEX Events - Higher Education (100)

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

Commission Decision No. 68488 requested that APS inform ACC Staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2021, the following measures that exceeded 50% of incremental cost were Upgraded Receivers, Zero-Loss Condensate Drains, Computer Room Air Conditioners, HiE Condensers, High-Efficiency Refrigerators, Packaged Terminal AC & HP, and Lighting Power Density.

APS submitted a 60-day notice on September 1, 2021 to adjust incentives for non-residential measures effective November 1, 2021. Measures that were adjusted include Variable Speed Drives and Packaged Terminal AC & HP.

MER Adjusted Gross MW and MWh Savings

The following table reflects the MER adjusted total energy and demand saving achievements in this Reporting Period for the New Construction program. Only savings from projects that were completed and incentives paid are counted in this Progress Report.

Table 33 - MER Adjusted Gross MW and MWh Savings - Non-Residential New Construction and Major Renovation

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
New Construction and Major Renovation	67,266	1,008,455	16.5
TOTAL	**67,266**	**1,008,455**	**16.5**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c. In 2021, the Non-Residential New Construction measures have seen significantly higher participation levels than anticipated. As a result, $5,248,618 were shifted to the Non-Residential New Construction program as permitted within the Commission's current budget shifting guidelines to fund these projects.

C. Schools Program

Description

The Schools Program includes a dedicated budget for schools and provides assistance for reducing the energy used in school buildings, including public, private and charter schools (K-

12). The incentives available for schools include the same DSM measures that are available for all non-residential customers, as well as lighting and refrigeration measures.

Pursuant to Decision No. 75323, APS provided notice that it was going to offer the same cost-effective DSM measures offered in the Schools Program to qualifying non-profit community organizations effective April 1, 2020. The non-profit results (included in the schools results) are provided below:

During this Reporting Period, three non-profit projects were paid. APS paid incentives on three non-profit customer applications from three unique customers totaling $36,266 in schools incentives during this Reporting Period. These projects resulted in 379 MWh of annual savings, 5,549 MWh of lifetime energy saving and a peak demand savings of 0.14 MW.

Program Goals, Objectives, and Savings Targets

- Maximize the energy savings that can be attained with available DSM funds by providing schools incentives to upgrade lighting, HVAC, refrigeration, and any other energy-consuming systems.
- Provide educational and training materials to facility managers and Trade Allies in order to aid schools in other energy conservation projects.
- Promote market transformation through APS Trade Allies and customer outreach.
- Provide incentives for other cost-effective DSM projects by allowing schools to participate in any non-residential DSM program.

Table 34 - Schools Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
3.2	14,429	227,958

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

In this Reporting Period, APS paid incentives for 112 applications from schools, all of which were paid from the schools fund category. This represents 25 unique school districts and charter schools.

The self-reported size of the school entity (based on the number of students) for approved applications paid in this Reporting Period are:

Table 35 - Schools Program Applications

Division	Programs	# of Applications	# of Students
Metro	K-12 & Non-Profit Prescriptive Measures - Retrofit, Chiller & EMS Measures All Customers	29	24,429
Metro	Chiller Measures - NC	1	700
Metro	Chiller & EMS Measures All Customers, K-12 & Non-Profit Prescriptive Measures - Retrofit	13	5,510
Metro	Chiller & EMS Measures All Customers, K-12 & Non-Profit Prescriptive Measures - Retrofit, K-12 & Non-Profit Custom Measures - Retrofit, K-12 & Non-Profit Prescriptive Measures - NC	16	34,556
Metro	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	244
Metro	K-12 & Non-Profit Prescriptive Measures - Retrofit, ARC Pilot - Retrofit, Prescriptive Measures - Retrofit	3	804
Metro	K-12 & Non-Profit Prescriptive Measures - NC, K-12 & Non-Profit Prescriptive Measures - Retrofit	5	5,536
Northeast	K-12 & Non-Profit Prescriptive Measures - Retrofit	6	9,555
Metro	Technical Assistance & Studies	1	30,866
Southeast	Chiller & EMS Measures All Customers, K-12 & Non-Profit Prescriptive Measures - Retrofit	2	6,710
Metro	Chiller & EMS Measures All Customers, K-12 & Non-Profit Prescriptive Measures - Retrofit	3	37,639
Metro	Chiller & EMS Measures All Customers	1	22,340
Southeast	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	1,701
Metro	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	716
Northeast	K-12 & Non-Profit Prescriptive Measures - Retrofit	8	1,980
Southwest	K-12 & Non-Profit Prescriptive Measures - Retrofit	12	6,266
Metro	Technical Assistance & Studies	1	2,118
Metro	K-12 & Non-Profit Prescriptive Measures - NC, K-12 & Non-Profit Custom Measures - NC	2	5,954
Metro	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	558
Metro	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	349
Southeast	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	9,965

Metro	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	22,444
Metro	K-12 & Non-Profit Prescriptive Measures - NC	1	1,926
Metro	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	307
Southeast	K-12 & Non-Profit Prescriptive Measures - Retrofit	1	298

When an incentive application is received from a school district and deemed eligible, funding is first allocated from the school's budget up to a maximum of $100,000. Any additional funding required to cover the application is then allocated from the appropriate Existing Facilities or New Construction budget. To fully utilize the Schools Program budget, three waivers to exceed this requirement were granted.

APS paid $1,262,832 in incentives to schools during the Reporting Period, of which $1,262,832 was paid from the Schools Program budget.

Table 36 - Schools Program Incentives Paid from Program Budget

Incentive Status by Fund for Paid Applications	Incentives Paid
Schools Budget – Prescriptive, Custom	$1,252,882
Schools Budget – Feasibility, Design Assistance	$9,950
Schools Budget – Retro-Commissioning Studies	$0
Total School Funds	**$1,262,832**

Table 37 – Total Schools Program Incentives Paid

Schools Funding Summary	Incentives Paid
Schools – School Funds	$1,262,832
Schools – Large Existing Funds	$0
Schools – New Construction Funds	$0
Schools – Small Business Funds	$0
Total Paid to Schools	**$1,262,832**

In Commission Decision No. 70637, the Commission ordered APS to continue tracking DSM applications resulting from studies for which incentives have been paid and report the semi-annual and cumulative results of its program-to-date tracking efforts. Two design study incentives were paid from the school funds during this Reporting Period for a total of $9,950. This application resulted in zero EE projects. Since program inception, 71 studies have been completed at schools; of those 71 studies, 56 have resulted in EE projects at schools.

In Commission Decision No. 73089, the ACC requested that APS report the type of measures installed after a study was completed. No measures were installed in 2021 based on completed studies.

Evaluation/Monitoring Activities and Research Results

- Conducted customer interviews to assess effectiveness of in-person and virtual energy assessments.

- Conducted research to update energy and demand impacts, load shapes, and incremental costs for 28 existing and new measures to support the 2022 implementation plan.
- Held monthly meetings with program manager to coordinate on evaluation activities and updates to measure-level savings and costs to accurately track and report program achievements.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Provided the implementation contractor the avoided costs, line loss factors, capacity reserve, and discount rates quarterly to support the implementation ensuring correct numbers are used to calculate societal benefits for the non-residential programs.
- Researched and calculated iDSM savings additions to EMS and high frequency battery charger measures.

Consumer Education and Outreach

Marketing and outreach activities described for the Large Existing program included K-12 schools. A custom QuickLook contains information on APS non-DSM products and services such as exclusive service plans and STEM mini grants.

During this Reporting Period, the Solutions for Business team performed 18 energy assessments for K-12 School customers to help identify energy management opportunities that ranged from lighting to HVAC to EMS/controls upgrades.

The Solutions for Business program team also participated in the following meetings (with estimated attendance included):

- January 6 Arizona School Facilities Board (30)
- February 3 Arizona School Facilities Board (30)
- March 3 Arizona School Facilities Board (30)
- April 7 Arizona School Facilities Board (30)
- May 19 Arizona School Facilities Board Meeting (30)
- June 30 Arizona School Facilities Board (30)
- July 21-23 AASBO Summer Convention (500+)
- August 4 Arizona School Facilities Board Meeting (30)
- September 1 Arizona School Facilities Board (30)
- October 18 Arizona School Facilities Board (30)
- October 27 Arizona School Facilities Board Meeting (30)
- November 8 Arizona School Facilities Board Meeting (30)
- December 15 Arizona School Facilities Board Meeting (30)

Coordination with the Schools Facility Board (SFB)

Members of the Solutions for Business outreach team attend in-person and virtual SFB meetings to stay abreast of school EE projects, both funding and progress. Emergency repairs approved by SFB include equipment covered by program specifications such as cooling systems. As these are approved, the Solutions for Business team follows up with the districts to see how they can assist in planning the upgrades, scoping projects, reviewing plans, and completing the rebate application to produce the greatest savings and maximum rebates possible through the program.

Coordination with the APS Schools Account Managers

Program staff coordinates with the APS Account Managers (AM) who are assigned to work with schools. This support allows staff to optimize their customers' time and get the most value during planned meetings. This partnership with the APS schools AMs has facilitated troubleshooting of other customer issues or concerns and the cross-promotion of other DSM programs, leading to increased benefits for schools and improved efficiency.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

During this Reporting Period, EMS and LED measures were installed. Commission Decision No. 73089 requires APS to report the number of these measures installed, the annual energy and capacity savings, and measure life on an individual basis. Please see Table 38 below.

Table 38 – Schools Program Measures Savings

Measure	Quantity	kWh Savings	kW Savings	Measure Life
EMS - DDC Replacing Pneumatic or Manual T-stat	0 sq. ft.	0	0	0
EMS - DDC Replacing Programmable T-stat or digital system	2,924,455 sq. ft.	11,157,847	2,908	15
EMS - Integrated Lighting Control	0 sq. ft.	0	0	0
LED - non-reflector	949	174,893	36	7
LED - reflector	2,056	392,494	82	7
LED - MR16	5	715	0	7
Linear LED 2 Foot	267	7,798	2	17
Linear LED 3 Foot	14	695	0	17
Linear LED 4 Foot	99,164	5,056,761	1,137	17
Linear LED 8 Foot	628	47,360	10	17
Outdoor LED Watts <= 50	3,063	1,992,555	0	12
Outdoor LED Watts >50 & <300	1,001	1,806,582	0	15
Outdoor LED Watts >300	0	0	0	0
Refrigerated Case LED - No Sensors	0	0	0	0
Refrigerated Case LED - With Sensors	0	0	0	0

*Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Commission Decision No. 68488 requested that APS inform ACC Staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2021, the following measures that exceeded 50% of incremental cost were Enhanced HVAC units, LED lamps with no reflector, and networked thermostats.

APS submitted a 60-day notice on September 1, 2021 to adjust incentives for non-residential measures effective November 1, 2021. Measures that were adjusted include Variable Speed Drives, Outdoor LEDs, LED lamps with no reflector, Networked Thermostats, Packaged Terminal AC & HP, and Enhanced HVAC. See the Existing Facilities and New Construction program sections for a list of program changes.

MER Adjusted Gross MW and MWh Savings

The following table reflects the total energy and demand saving achievements for Schools projects completed and paid during this Reporting Period.

Table 39 - MER Adjusted Gross MW and MWh Savings - Non-Residential Schools Program

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Schools - School Program Funds	25,019	379,817	5.4
Schools - Existing Program Funds	0	0	0.0
Schools - New Construction Program Funds	0	0	0.0
TOTAL	**25,019**	**379,817**	**5.4**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

D. Advanced Rooftop Controls Pilot (ARC)

Description

The Advanced Rooftop Controls (ARC) pilot offers K-12 Schools and qualifying non-profit customers incentives for improving the efficiency of their HVAC system and indoor air quality by installing qualifying equipment including advanced rooftop controls with VSD, and an outdoor air economizer and energy management system, which are installed in conjunction with the VSD. Decision No. 78164 approved the ARC pilot program, effective July 28, 2021. Prescriptive incentives are available for DSM improvements in HVAC systems.

Program Goals, Objectives, and Savings Targets

- Promote energy efficiency in qualifying facilities.
- Improve fresh air ventilation inside these facilities.

Table 40 - ARC Pilot Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
NA	NA	NA

2021 program goals and objectives for the ARC Pilot were not filed in APS's DSM Implementation Plan, but were added per an approved Amendment to the plan when approved by the Commission.

Levels of Customer Participation

In this Reporting Period, APS paid a total of $132,814 in ARC incentives. This represents three applications from three unique customers. One of the three applications was for a non-profit, wo of the three applications were from a school district, and none of the applications were from a Title I school.

Incentive status is provided below.

Table 41 - ARC Pilot Program Incentives Paid

Incentive Status by Fund for Paid Applications	Incentives Paid
ARC Pilot Program – Title I Schools	$0
ARC Pilot Program - Schools	$102,614
ARC Pilot Program - Non-Profit	$30,200
ARC Pilot Funds	**$132,814**

Evaluation/Monitoring Activities and Research Results

- Developed three measure analysis spreadsheets to support the implementation of the Advanced Rooftop Control pilot.
- Created a uniform workpaper template for savings reporting and verification for the Advanced Rooftop Control pilot program.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential measure analysis spreadsheets and analytic database.

Consumer Education and Outreach

In addition to the marketing and outreach activities described for the Existing Facilities program, outreach activities for the ARC pilot included responding to customer requests, attending customer meetings, and working with Trade Allies, industry professionals and customers on their ARC project applications.

Due to COVID-19 restrictions during this Reporting Period, meetings transitioned from an in-person to virtual format. These meetings included (with estimated attendance):

- August 16 St. Vincent De Paul/E2O Energy (4)
- August 17 Great Hearts Academy/E2O Energy (3)
- September 1 Hayden Winkelman Unified School District (3)
- September 14 Holbrook Unified School District (2)
- September 28 Imagine Prep/E2O Energy (4)
- October 6 Notre Dame Prep/E2O Energy (3)
- October 7 Paloma Elementary School District (2)
- October 28 AGR Consulting (2)
- November 22 Commercial Green Solutions (5)
- December 10 Odyssey Prep School/E2O Energy (2)

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period

MER Adjusted Gross MW and MWh Savings

The following table reflects the MER adjusted total energy and demand saving achievements in this Reporting Period for the ARC pilot. Only savings from projects that were completed and incentives paid are counted in this Progress Report.

Table 42 - MER Adjusted Gross kW and kWh Savings - ARC Pilot Program

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
ARC Pilot Program – Title I Schools	0	0	0.0
ARC Pilot Program - Schools	694	7,988	0.2
ARC Pilot Program - Non-Profit	189	2,085	0.1
TOTAL	**882**	**10,073**	**0.3**

*Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c. Commission Decision No. 78164 established the Advanced Rooftop Controls pilot. As a result, $150,000 were shifted from the Existing Facilities program as permitted within the current ACC budget shifting guidelines to fund these projects.

E. Energy Information Services (EIS) Program

Description

The EIS program started in November 2006 with an objective to help customers (>100 kW) save energy through better understanding and control of their facilities' energy use. EIS is a tool that provides usage (kWh) and demand (kW) data. This detailed information allows customers the ability to fine-tune equipment use, operations and produce reports to document the impact of usage and demand modifications. Participating customers monitor their electric usage through a web-based dashboard that allows them to view 15-minute interval data and demand graphs of their usage from the previous day. This information can be used to improve and monitor energy usage patterns, reduce energy use, reduce demand during on-peak periods and better manage overall facility energy operations.

APS is encouraging customers to take advantage of the EIS program by providing a one-time incentive of up to a maximum of $12,000 per year to cover the cost of the metering and communications equipment necessary to participate in the program.

Program Goals, Objectives, and Savings Targets

- Provide monthly energy usage information to participating non-residential customers in order to identify strategies to lower energy cost by reducing energy usage and demand.
- Educate EIS program participants about utility rate concepts and how managing or reducing their energy consumption through DSM measures and operational practices can reduce their energy expenses.
- Educate participants on how to download information to chart and graph their energy use, as well as to identify consumption trends and savings opportunities.
- Educate EIS participants about creating reports for management that justify energy-efficient capital expenses that can produce operations and maintenance savings.

- Facilitate analysis of what-if scenarios to help the facility manager assess the benefits of capital improvements or operating adjustments to promote energy efficient changes/projects.

Table 43 - Energy Information Services Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
1.3	5,616	28,079

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

Several customers were added to the program in 2021 while other customers opted out, with a net result of one less customer enrolled in EIS at the end of this Reporting Period. The number of enrolled meters was increased by 57 in 2021. A total of 67 customers composed of 587 meters are currently enrolled in the EIS program.

Evaluation/Monitoring Activities and Research Results

- Continued to review and update program Measure Analysis Spreadsheets and Analytic Database.
- Created a uniform workpaper template for savings reporting and verification.

Consumer Education and Outreach

APS account managers proactively arrange meetings between customers and the program team to discuss the customer's objectives and demonstrate the product's capabilities/benefits. The team also provides training to new employees at the customer's request to ensure the tool continues to be successfully utilized in spite of employee turnover.

- April 21 Energy Information Service Webinar (32 attendees)

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

MER Adjusted Gross MW and MWh Savings

Table 44 - MER Adjusted Gross MW and MWh Savings - Non-Residential Energy Information Services Program

Program	# Meters	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Energy Information Services	166	3,729	18,644	3.9
TOTAL	**166**	**3,729**	**18,644**	**3.9**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c. In 2021, the non-residential New Construction measures have seen significantly higher participation levels than anticipated. As a result, $129,500 were shifted from the EIS program as permitted within the current ACC budget shifting guidelines to fund these projects.

VI. Demand Response Programs

A. TOU Rates

Description

TOU rates are designed 1) to reflect the time variation in the cost of producing electricity and more accurately match those costs with the service being provided to the customer, thereby encouraging efficient use of energy, and 2) to encourage customers to reduce consumption during peak hours or to shift energy usage to off-peak periods.

Program Goals, Objectives, and Savings Targets

Using 2020 savings data, the program is estimated to provide a 2021 load reduction amount of approximately 193 MW. The 193 MW total load reduction is based on a calculated estimate of 846,103MWh in annual savings from January through December 2020. Load reduction and savings targets are summarized in Table 10 – Demand Response Program/Initiative Load Reduction and Energy Savings 2021.

Levels of Customer Participation

Approximately 724,191 customers are enrolled in TOU rates. As of December 2021, 155 schools were enrolled in the TOU school rates.

Evaluation/Monitoring Activities and Research Results

For the purposes of this report, no evaluation of TOU rates was performed during this Reporting Period.

Consumer Education and Outreach

APS continued its ongoing rates and energy education campaign throughout 2021. The education campaign was conducted through bill, email, and direct mail communications, as well as digital media. Messaging advised customers on how to save on their current TOU plan and promoted TOU plans to customers who could save money by transitioning to a TOU or TOU plus demand plan.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Programs or Measures Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

B. APS Peak Solutions® Program

Description

APS Peak Solutions® is a commercial and industrial (C&I) demand response (DR) program for APS customers utilizing direct load control and manual load reduction.

The program began on June 1, 2010. The current program is available for the summer months of June through September between 4 p.m. and 9 p.m. daily. Customers are offered the

option to be notified one hour prior to the start of a Peak Solutions® event or 24 hours in advance. Events are limited to a minimum of one hour and maximum of five hours per day and 90 event-hours during the season.

Customers are paid an incentive check at the end of the season for their enrolled and/or delivered load reduction amount based on $/kW.

Program Goals, Objectives, and Savings Targets

In 2021, a total of seven days of events were dispatched between June and September. The highest MW load reduction was achieved on June 16th with a result of 28.2 MW average for the event. The program yielded a calculated 574,871 MWh of combined energy savings for all events. Load reduction and savings targets are summarized in Table 10 – Demand Response Program/Initiative Load Reduction and Energy Savings 2021.

Levels of Customer Participation

Approximately 68 customers are enrolled in the program.

Evaluation/Monitoring Activities and Research Results

No evaluation activities were completed during this Reporting Period.

Consumer Education and Outreach

Education and outreach to customers to renew their participation in the program and to recruit additional customers. Additional capacity was added to the program allowing for additional customer participation up to 60 MW per event.

Problems Encountered and Proposed Solutions

Capacity results were lower than expected due to COVID-19 impacts on customer load curtailment plans and slower than anticipated recruiting of additional customers into the program.

Programs or Measures Modifications/Terminations

The Peak Solutions® program was modified in 2021 from previous years, most notably with a new program implementor and higher capacity targets. The capacity of the program was increased to a 60 MW goal in 2021. The parameters of the program were changed with increases in duration of events to five hours between the hours of 4 p.m. to 9 p.m., seven days per week.

Costs Incurred

Cost information is provided in Tables 2b and 2c. In 2021, the non-residential New Construction measures have seen significantly higher participation levels than anticipated. As a result, $1,772,013 were shifted from the Peak Solutions® program as permitted within the current ACC budget shifting guidelines to fund these projects.

C. Critical Peak Pricing – General Service and Residential

Description

Critical Peak Pricing (CPP), or its marketing name of Peak Event Pricing, is a DR program for both APS business (or General Service) and residential customers in the Yuma and Phoenix metro areas utilizing manual load reduction. CPP became effective on January 1, 2010.

The program provides a price signal to incent customers to reduce their usage during events initiated by APS. CPP events will take place during June through September, weekdays between 3 p.m. and 8 p.m. (Monday through Friday), excluding holidays. Customers will be notified of an event by telephone or email by 4 p.m. of the day prior to the CPP event. Peak

Events are limited to 80 hours during the season. APS is required to initiate a minimum of six events and a maximum of 18 events.

Customers receive a kWh discount incentive off their existing rate for all the electricity usage during the program months of June through September.

Program Goals, Objectives, and Savings Targets

The program is estimated to provide a 2021 load reduction amount of 0.2 MW, based on 2020 CPP savings results. Actual results will not be available until March 2022. The 0.24 MW load reduction will provide 5 MWh of calculated annual savings. Load reduction and savings targets are summarized in Table 10 – Demand Response Program/Initiative Load Reduction and Energy Savings 2021.

Levels of Customer Participation

Approximately 220 residential and no business customers are enrolled in the program.

Evaluation/Monitoring Activities and Research Results

Seven CPP events were called during this Reporting Period and resulted in an estimated average of 0.79 kW load reduction/customer per event.

Consumer Education and Outreach

Customers in the program were emailed energy reduction tips during event periods.

Problems Encountered and Proposed Solutions

No problems were encountered during the Reporting Period.

Programs or Measures Modifications/Terminations

No program modifications or terminations were made during this Reporting Period.

D. Demand Response, Energy Storage and Load Management/Rewards Initiative

Description

The Demand Response, Energy Storage and Load Management (DRESLM) initiative was approved by the Commission on August 23, 2017, in Decision No. 76314. The initiative includes emerging technologies for managing system load shapes and helping customers shift energy use to lower cost off-peak hours including battery storage, connected water heaters, and DR with smart thermostats. It is being marketed to APS customers as the "Rewards" initiative which includes Storage Rewards (battery storage), Reserve Rewards (connected water heaters), and Cool Rewards (smart thermostats).

Program Goals, Objectives, and Savings Targets

As filed in the 2021 DSM Plan, the program goal was to achieve 216.5 MW of peak demand savings.

Table 45 - DRESLM / Rewards Initiative Goals & Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
216.5	449	5,839

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

Upon program approval, APS began work to implement the initiative including conducting a comprehensive technology assessment and issuing Requests for Proposals to potential suppliers for each of the load management technologies, as well as a Distributed Energy Resource Management (DERM) platform to enable APS to communicate with and control these distributed energy resources.

In 2018, APS began marketing the program to customers, starting with the Cool Rewards element of the initiative in August. Marketing for the Storage Rewards element started in November 2018 and Reserve Rewards kicked off in early 2019. Storage and Reserve Rewards program participation was fully subscribed heading into 2020. Participation in each program element as of the end of the Reporting Period is shown in the table below.

Table 46 - MER Adjusted Gross MW and MWh Savings - DRESLM/Rewards Initiative

Measure	# Participants	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Cool Rewards - Smart Thermostat Demand Response	56,615	363	363	67.5
Reserve Rewards - Connected Heat Pump Water Heaters	222	183	183	0.2
Storage Rewards - Residential Batteries	35	0	0	0.1
Intermediate Feeder Scale Batteries	0	0	0	0.0
TOTAL	**56,872**	**546**	**546**	**67.8**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Seven Cool Rewards DR events were called during this Reporting Period and resulted in an average of 1.08 kW at generator load reduction per thermostat per event.

For the Storage Rewards program element, 35 residential scale batteries were operating during this Reporting Period. Five additional batteries were in construction or awaiting activation at the end of 2021.

For the Reserve Rewards program element, a total of 222 connected water heaters were operating during the first quarter of 2021 providing a total energy storage capacity of 0.4 MWs (including capacity reserve and line losses).

APS is using results of the Reserve Rewards initiative in 2020-2021 to apply the learnings to the connected water heating controls measures that were approved in October 2020 per decision 77763 (October 2, 2022). While there is significant load shifting potential available from water heating, total Reserve Rewards load shifting results were lower than anticipated due to two contributing factors: 1) challenges with maintaining wi-fi connectivity to participating water heaters and 2) the high energy efficiency level of participating heat pump water heaters which significantly reduces the water heater load that is available to shift. The water heaters operate effectively to meet customer needs, but grid management challenges persist.

APS is still working with EnergyHub and Rheem to address opportunities to improve connectivity and load shifting performance for participating heat pump water heaters in the Reserve Rewards initiative while simultaneously using these learnings in the implementation of new water heating programs – including the use of connected controls on existing electric resistance water heaters that provide greater load shifting potential and use of alternative communications options such as dedicated cellular connections. APS will update stakeholders on these activities as part of ongoing DSM Collaborative meetings this year. While management of the Reserve Rewards fleet is paused, APS plans to re-engage the participating customers when these technical challenges are resolved.

In addition, three feeder scale batteries, referred to as Integrated Feeder Energy Storage System (IFESS) batteries, were installed and operating during the previous Reporting Period. The feeder scale batteries are sized at 350 kW, 475 kW and 475 kW, providing a total energy storage capacity of 1.8 MWs (including capacity reserve and line losses). These batteries were taken out of service out of an abundance of caution following the event with the McMicken facility, and were not in service during this Reporting Period. APS plans to reenergize these batteries at new locations in the future with updated safety protocols and will resume reporting once the batteries have been reenergized.

Evaluation/Monitoring Activities and Research Results

- Developed ongoing evaluation plans to determine hourly energy and demand impacts and characterize the customer experience for the Cool Rewards program.
- Supported the initial planning prior to the 2021 Cool Rewards season. Attended meetings with key Cool Rewards stakeholders and the program manager to determine key objectives and research questions for the 2021 season. Coordinated with EnergyHub to determine testing protocol was implemented as needed.
- Met weekly with program managers during the demand response season to determine when to call events and coordinate fielding post-event surveys.
- Updated Cool Rewards forecasting tool to allow APS to predict impacts from DR events based on the type of event being called and the number of devices being dispatched.
- Developed a dashboard to provide fast feedback results of DR event impacts. Updated the dashboard throughout the 2021 season and provided impacts within a week of event days.
- Developed and fielded two types of customer surveys to Cool Rewards participants to collect customer experience data. The post-event survey was fielded after seven (of seven) demand response events to gather feedback related to participants' experiences on that event day. The end of season survey was fielded to collect data on participants' feedback over the full season.
- Conducted an end-of-season impact evaluation for Cool Rewards to validate fast feedback results. The end-of-season evaluation included exploratory analyses as well, to determine how impacts vary for different event types and customer segments, learn about impacts during control periods beyond the event period, estimate energy impacts, and provide insights for the 2022 season.
- Explored data – opt-out status and connectivity – from participants' thermostats to understand how they interacted with their devices during the Cool Rewards DR events.
- Completed impact analysis of Storage Rewards. Full results, to be presented in 2022, will include load shifting impacts and demand savings, energy savings, and bill impacts. In addition, estimation of the battery round trip efficiency and evidence of any changes to consumption pattern will be reviewed.

- Designed, fielded, and analyzed customer experience interviews for Storage Rewards program to assist with program design and implementation of the new Residential Battery Pilot.

Consumer Education and Outreach

Cool Rewards acquisition efforts during 2021 focused on promoting Demand Response PRE-enrollment (DRPRE), which was introduced in late 2020. DRPRE helps reduce the cost of smart thermostats through instant rebates at time of purchase on APS Marketplace for customers who agree to participate in one year of Cool Rewards. Outreach included email, direct mail, bill inserts, digital and social ads, radio, outdoor, print, and TV to help grow awareness and program enrollment. In addition, manufacturers are active in the acquisition of new participants. As smart thermostats are installed, manufacturers reach out to customers, through email, smart thermostat displays and apps, to promote and enroll their devices in the DR program.

Both Storage Rewards and Reserve Rewards were implemented to target specific APS distribution feeders where a high penetration of solar was present; recruitment of customers in these areas received direct mail, email and targeted social media campaigns until enrollment was filled. However, with customers moving away from and into homes with APS-owned batteries, there were small changes in participation numbers for Storage Rewards in 2021; the program is now closed for recruitment. APS, Guidehouse, and Tierra Resource Consultants performed a customer survey for Storage Rewards participants. APS issued a Storage Rewards newsletter in 2021 and intends to continue to dispatch periodic newsletters to these customers throughout the program.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Programs or Measures Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

VII. Financing Programs

Energy Efficiency Financing

On November 30, 2018, APS filed a notice of intent to discontinue the EE financing program. The residential and non-residential financing programs were discontinued on January 1, 2019.

VIII. Energy Efficiency Initiatives

A. APS System Savings Initiative

Description

The APS System Savings Initiative was approved by the Commission in Decision No. 75323. The initiative is designed to save energy through EE upgrades to APS generation facilities, the transmission and distribution system, and APS-owned streetlights, buildings and facilities.

Program Goals, Objectives, and Savings Targets

The objective of the APS System Savings Initiative is to take advantage of opportunities for energy savings within APS generation, transmission, distribution, and operation facilities. The initiative offers the potential for significant cost-effective energy savings that can help lower EES compliance costs for ratepayers while meeting the energy savings objectives of the EES.

Table 47 - APS System Savings Initiative Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
0.0	6,020	90,294

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

By the end of 2021, there were a total of 14 APS distribution feeders that were installed and operating with Conservation Voltage Reduction.

Evaluation/Monitoring Activities and Research Results

During the program approval process, APS worked closely with ACC Staff and independent third-party evaluators to review and confirm the energy savings and cost effectiveness calculations for this initiative. As projects have been implemented, APS has used the same processes to calculate and report savings that are currently being used for similar measures in the non-residential Solutions for Business program. All documentation of APS System Savings projects has been provided to the independent third-party evaluator for review and verification.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

Consumer Education & Outreach/Codes Support Activities

Not applicable.

Other Significant Information

No other significant information to report at this time.

MER Adjusted Gross MW and MWh Savings

Table 48 - MER Adjusted Gross MW and MWh Savings - APS System Savings Initiative

Project	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Conservation Voltage Reduction	14 feeders	6,020	6,020	0.0
TOTAL	**14 feeders**	**6,020**	**6,020**	**0.0**

Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

Pursuant to Decision No. 75323, APS does not currently calculate net benefits or earn a performance incentive on energy savings from the APS System Savings Initiative.

Costs Incurred

There were no costs incurred for this program that are being collected through the DSMAC.

Consumer Education and Outreach

Not applicable.

B. Energy Codes and Appliance Standards Initiative

Description

The Energy Codes and Appliance Standards (C&S) Initiative delivers energy savings by supporting better compliance with energy codes and appliance standards in jurisdictions throughout the APS service territory by working with code officials, building professionals and other market actors to develop strategies for achieving better code compliance more cost effectively.

C&S can be one of the most cost-effective ways of promoting DSM. C&S activities may be utilized to deliver low-cost energy savings while supporting Arizona building officials, the construction community, customers, and stakeholders. APS supports C&S activities with a multifaceted approach that provides unbiased support, information, resources, and expertise to jurisdictions and Trade Allies within the APS service territory.

- Residential and Commercial Energy Codes – Activities are intended to support building officials, the builder community, and interested stakeholders. Targeted activities include providing technical support, research, subject matter expertise, resources, and training. Training classes are customized to meet local jurisdictional needs and are based on the climate zone and code that is currently being adopted. The classes help to translate building code requirements into a process for builders to follow with subcontractors in the field to ensure that each trade knows their role in code compliance and how to properly install construction details to meet code.

Utility programs are inextricably linked to building codes and appliance standards. Utility DSM programs act as a catalyst to ready the market for new technologies or standards that are not currently common practice in the marketplace. By providing incentives, Trade Ally training and educating consumers, utility programs help to increase adoption of new energy efficient technologies and practices. Over time these practices become the commonly accepted business practice, and the market adopts higher C&S as a result. While this helps to further the goal of EE, it also has a direct impact on the available market potential for utility programs. This is due to the fact that utility program savings are calculated using current building codes and appliance standards as the "baseline" for comparison.

In general, energy savings for utility program measures are calculated by taking the efficiency differential from the baseline product (typically represented by current building codes and appliance standards) as compared to the high-efficiency product being promoted by the utility program.

Program Goals, Objectives, and Savings Targets

The goal of the APS C&S Initiative is to promote increased EE in the APS service territory through advancement of building codes and appliance standards, including increasing code awareness and better code compliance. Savings are quantified through independent MER evaluation. During this Reporting Period, energy savings are being reported resulting from codes and standards efficiency increases in residential new construction, commercial new construction, general service lamps, linear fluorescents, motors, and HVAC.

Table 49 - Codes Initiative Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
6.7	27,959	243,450

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

Participation levels are identified in APS C&S Report for 2021, issued by Guidehouse. This report will be submitted to the Commission in a subsequent filing.

Evaluation/Monitoring Activities and Research Results

- Continued to review and update program measure analysis spreadsheets and analytic database for C&S measures.
- Updated the C&S savings report for regulatory compliance.

Problems Encountered and Proposed Solutions

Due to COVID-19, building official trainings were conducted virtually throughout the 2021 program year.

Program Modifications/Terminations

No measures were modified or terminated during this Reporting Period.

Consumer Education & Outreach

- Sponsored building science and IECC code compliance class, virtually at the AZBO Fall institute.
- Sponsored IECC 2021 EE compliance trainings directly to building officials in their offices and virtually.

Other Significant Information

No other significant information to report at this time.

MER Adjusted Gross MW and MWh Savings

Table 50 - MER Adjusted Gross MW and MWh Savings - Building Codes and Appliance Standards Initiative

Measure	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Residential New Construction	2,606	52,120	1.3
Commercial New Construction	2,532	37,980	0.6
General Service Lamps	13,548	27,096	1.9
Linear Fluorescents	5,630	101,340	1.5
Motors	1,118	22,360	0.4
HVAC	965	14,475	0.5
Pool Pumps	1,136	18,176	0.0
Ceiling Fans	1,085	18,445	0.1
TOTAL	**28,620**	**291,992**	**6.3**

*Savings are adjusted for line losses (Energy 6.5%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation
The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred
Costs incurred for this program during this Reporting Period are shown in Tables 2b and 2c.

C. Energy and Demand Education

Description
This program includes multiple customer engagement channels and initiatives that provide energy information tools and resources to help consumers better manage their energy use and demand. These tools can help educate customers about the ways that they use energy and point out opportunities for savings. The result is a more informed consumer who better understands how to manage their energy use, improve efficiency and save energy costs.

During this Reporting Period, the Energy and Demand Education program consisted of multiple program elements including:

- Online Marketplace – provides access to information, APS rebates, and special discounts on energy efficient devices and appliances.
- Virtual Energy Check-Up – provides free virtual energy audits and savings tips for customers who use their smart phone in the comfort of their own home to access an APS energy expert who can use the smart phone camera to interact with the customers to help point out ways to save energy, including setting up smart thermostats to save peak energy use with TOU rates.
- Online Energy Audits – provides self-service web tools that help residential and commercial customers analyze energy costs and find customized tips for saving energy and money.
- Energy Tips Marketing/Advertising – promotes ways to save energy and money.

Program Goals, Objectives, and Savings Targets
The objective of this program is to help customers save energy and money on the energy costs of their homes and businesses.

The program does not include specific savings targets, but APS intends to report any savings that can be quantified as a result of the program. APS is working with third-party evaluators to measure and report savings from this program that result from customers purchasing more efficient appliances through the marketplace.

Levels of Customer Participation
During this Reporting Period, the program received the following participation:

- Online Marketplace (launched September 2020) – 588,684 unique site visits, 19,082 free LED kits claimed, and 33,191 Cool Rewards pre-enrollments processed
- Virtual Energy Check-up (launched October 2020) – 73 check-ups completed

Evaluation/Monitoring Activities and Research Results
During this Reporting Period, research was focused on LED kits, smart thermostats DRPE, and on market-based savings potential.

Problems Encountered and Proposed Solutions
No problems were encountered during this Reporting Period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

Other Significant Information

No other significant information to report at this time.

MER Adjusted Gross MW and MWh Savings

No energy savings to report during this Reporting Period, although the program results in significant energy savings from consumers making changes in their energy use as a result of information delivered by the program.

Benefits and Net Benefits/Performance Incentive Calculation

APS does not currently calculate net benefits or earn a performance incentive on energy savings from the energy and demand education initiative.

Costs Incurred

Costs incurred for this program during this Reporting Period are shown in Tables 2b and 2c.

Consumer Education and Outreach

The program delivers education and outreach through a variety of channels including online, phone, virtual, in-person events (when permitted), marketing, and advertising.

D. EV Charging Demand Management Pilot Program

Description

The EV Charging Demand Management pilot will target EV owners in the APS service territory, including residential customers with individual passenger vehicles as well as commercial vehicle fleets were applicable. APS will target both existing EV owners as well as new EV buyers to encourage participants to share EV driving and charging data and participate in managed charging DR.

The APS SmartCharge program encourages EV owners to share data on their driving and charging behavior by either installing a data sharing module in the diagnostic port of their car or granting permission to share their car account data using an API with the implementer. SmartCharge participants receive an incentive of $85/year, which includes a $25 sign up incentive and $5/month incentive for providing ongoing data. Once one year of data is collected, APS will phase in a reward offering that will encourage favorable charging behaviors.

Also, as part of this pilot program, APS is offering a $250 rebate to customers that purchase a new connected smart charger. Smart chargers are connected to the internet and can provide telemetry data on home charging behavior as well as participate in load shifting and DR events. Qualifying smart chargers are sold on the APS online marketplace where the rebate is immediately applied at checkout or if the eligible charger is purchased at a local retailer the rebate is reimbursed using an online rebate process.

The EV Charging Demand Management pilot program is intended to proactively address the growing electric demand from EV charging as EVs become more widely adopted.

Program Goals, Objectives, and Savings Targets

The EV Charging Demand Management pilot's objective is to dynamically manage EV charging and educate customers about beneficial charging behavior that occurs during off-peak periods whenever possible. Electric system benefits will be realized by managing EV charging based on seasonal and evolving distribution and system level needs, including DR events as needed. This will result in significant customer benefits including fuel savings, lower transportation

costs, reduced tailpipe emissions, and more efficient electric system operations that help manage future energy costs.

Table 51 - EV Charging and Demand Management Pilot Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
0.0	0	0

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

The APS SmartCharge program had 458 EV owners enroll to participate and share data during this Reporting Period.

Evaluation/Monitoring Activities and Research Results

Developed a new measure analysis spreadsheet for the level 2 electric vehicle charger measure.

Consumer Education and Outreach

During this Reporting Period, APS sponsored an EV drive event in Avondale on November 14, 2021 where APS educated customers about the SmartCharge program.

Problems Encountered and Proposed Solutions

This pilot program did not encounter any problems during this Reporting Period.

Program Modifications/Terminations

No pilot program modifications or terminations were made during this Reporting Period.

Other Significant Information

There is no other significant information to report during this Reporting Period.

MER Adjusted Gross MW and MWh Savings

There are no energy or demand savings to report during this Reporting Period.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

E. Tribal Communities EE Program

Description

The Tribal Communities EE Program was approved by the Commission in Decision No. 78052 dated June 24, 2021. The initiative is designed for Navajo and Hopi tribal members and businesses who are APS customers located within the Navajo and Hopi reservation boundaries, trust lands, or in communities directly adjacent to these areas.

Program Goals, Objectives, and Savings Targets

The objective of the Tribal Communities EE Program for residential and non-residential customers is to provide opportunities for energy savings by encouraging customers to install eligible energy-efficient equipment. The initiative offers outreach, assessments and incentives including eligible EE improvements.

Table 52 - Tribal Communities Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
0.1	516	4,214

Based on 2021 program goals and objectives as filed in APS's DSM Implementation Plan on December 31, 2020.

Levels of Customer Participation

By the end of 2021, there were a total of 22 residential and six non-residential APS customers who participated in the program.

Evaluation/Monitoring Activities and Research Results

- Developed research plan and initiated process evaluation of Tribal EE program to assess efforts to serve APS customers who are members of the Navajo and Hopi nations.
- Reviewed and updated measure analysis spreadsheets and analytic database for Tribal program measures.
- Created a uniform workpaper template for savings reporting and verification for both commercial and residential programs.
- Developed energy and demand impacts, load shapes, and incremental costs for mini-split AC/HP to include in the 2021 DSM Plan for the new Tribal Communities EE non-residential program.

Problems Encountered and Proposed Solutions

The presence of COVID-19 during most of the program year affected implementation in several ways in order to keep staff and customers safe.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

Consumer Education & Outreach Support Activities

Outreach activities for the Tribal EE Program Initiative for residential customers included a radio and marketing campaign and for non-residential customers included responding to customer requests, providing assessment reports, and working with Trade Allies and customers on their non-residential Tribal EE Program Initiative project applications. Marketing brochures were also developed to be used for education and outreach activities in non-residential areas.

Other Significant Information

No other significant information to report at this time.

MER Adjusted Gross MW and MWh Savings

Table 53 - MER Adjusted Gross kW and kWh Savings - Tribal Energy Efficiency Program

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Tribal - Residential	93	1,698	0.0
Tribal - Non-Residential	45	567	0.0
TOTAL	**138**	**2,265**	**0**

*Savings are adjusted for line losses (energy 6.5%, demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Costs incurred for this program during this Reporting Period are shown in Tables 2b and 2c.

IX. Measurement, Evaluation and Research

Description

Guidehouse provides MER services for APS's DSM programs. These MER activities include, but are not limited to:

- Performing process evaluation research to indicate how well programs are working to achieve their objectives.
- Performing impact evaluation research to verify that energy-efficient measures are installed as expected; measure savings on installed projects to monitor the actual program savings that are achieved; and conduct research activities to refine savings and cost benefit models and identify additional opportunities for EE.
- Tracking and verifying savings measurements to monitor the actual program savings that are achieved.
- Researching additional opportunities for EE, DR and DRESLM measures and programs.
- Conducting updates and maintenance of measure analysis spreadsheets and analytic databases for all APS programs and measures. Updates include calculation of electric energy and demand impacts, hourly end-use load-shapes, natural gas impacts, water impacts, incremental equipment costs, and O&M cost impacts.
- Providing support for program design options to be included in the annual DSM program portfolio including program design, technology research, EE measure analysis, and cost-effectiveness analysis.
- Updating the Technical Reference Manual (TRM) detailing savings algorithms, performance variables, and incremental cost assumptions for new and existing measures rebated through APS DSM programs.
- Modeling the percentage of savings occurring during on- and off-peak time periods for all DSM measures to understand their contribution to mitigating Duck Curve-related issues.
- Develop a methodology and model framework to quantify the locational benefits of measures within the portfolio at the feeder or substation level, and recommend an optimally cost-effective portfolio of DER tailored to the net load at specific locations.

The approach for measurement and evaluation of the DSM programs is to integrate data collection and tracking activities directly into the program implementation process.

The APS MER Verification Report for 2021, prepared by Guidehouse, will be provided as a separate filing.

CERTIFICATION BY APS OF DSM ANNUAL PROGRESS REPORT FOR THE PERIOD:

JANUARY THROUGH DECEMBER 2021

Pursuant to Decision No. 67744 (April 7, 2005), I certify that to the best of my knowledge and based on the information made available to me, the DSM Annual Progress Report is complete and accurate in all material respects.

03/01/2022
Date

Jacob Tetlow
Executive Vice President, Operations Non-Nuclear